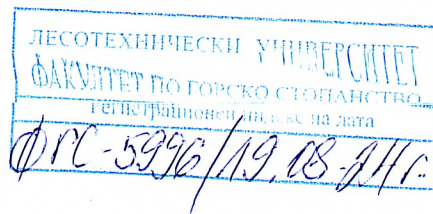


## REVIEW



on the materials submitted for participation in a competition for „Professor“ in the field of higher education **6. Agricultural sciences and veterinary medicine**, Professional field **6.5. Forestry**, Scientific specialty „**Technology, Mechanization and Automation of Forestry and Timber Harvesting**“ in the discipline „**Mechanization of forestry works**“

In the competition for professor, published in the State Gazette, No. 35 of 19.04.2024 and on the site of the University of Forestry with the code FOR-P-0324 for the needs of the Department of Technologies and Mechanization in Forestry“ at the Faculty of Forest Industry, as a candidate participate Assoc. Prof. Dr. Konstantin Ivanov Marinov, Faculty of Forestry, Department of Technologies and Mechanization in Forestry.

**Reviewer:** Georgi Tsvetkov Georgiev, D.Sc., Professor in a Professional Field 6.5 Forestry, from Forest Research Institute, Bulgarian Academy of Sciences

### 1. Brief biographical data for the candidate

Konstantin Ivanov Marinov was born on 10.11.1961 in the city of Sofia. He studied at the Wilhelm Peak Technical School of Energy (now the Henry Ford Vocational School of Motor Vehicles and Energy) and graduated in 1980 as a mechanical engineer in internal combustion engines. In the period 1982-1983, he worked as a mechanic for the repair and maintenance of automotive equipment at the "Mechanization and Motor Vehicles" Co., Ltd., Kremikovtsi, Sofia.

In 1983, Konstantin Marinov began studying at the Higher Forestry Institute (HFI) - now the University of Forestry (UF). In 1988, he graduated as a mechanical engineer in the mechanization of forestry, majoring in "Complex mechanization and flow lines in forestry and logging" and started working as an engineer-researcher at the Scientific Research Sector at UF. In 1989, he was elected as an Assistant in the Department of Forestry Mechanization. In the same department, he worked as a Senior Assistant (1992-1999) and Head Assistant (1999-2009). In 2007, he defended his dissertation on the topic "Technological research on the mechanical de-winging of seeds from some coniferous tree species" and received the educational and scientific degree "Doctor". In 2009, he was elected as an associate professor at the Department of "Technology and Mechanization in Forestry", where he is currently engaged in teaching and research activities in the field of mechanization and technologies in forestry. He is the head of the Department "Technologies and Mechanization in Forestry" (2016-2020; 2024-present). Assoc. Prof. Dr. Konstantin Marinov is a member of scientific and professional organizations: Union of Scientists in Bulgaria, Section "Forestry"; Association for Energy Utilization of Biomass - Bulgaria /AEOB-EUBA. He is a representative of UF in the Bulgarian Institute for Standardization, Technical Committee (TC) 14 "Road vehicles, internal combustion engines, tractors and machinery for agriculture and forestry" and TC 23 "Tractors and machinery for agriculture and forestry", a member of an expert commission in the Ministry of Agriculture, Food and Forestry under Regulation 12, in connection with the Law on Agricultural and Forestry Equipment (2016-2018), and an expert working group in the



Executive Agency for Forestry under the project "Regional policies for sustainable bioenergy BIO4ECO", Program "INTERREG Europe of the EU".

## **2. Correspondence of the submitted documents and materials of the applicant according to the Rules of the Development of academic staff at the University of Forestry.**

The documents and materials of Assoc. Prof. Dr. Konstantin Ivanov Marinov fully meet the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria, the Regulations for its Application and the Regulations for the Development of the Academic Staff at UF for occupying the academic position "Professor".

The candidate appears in the competition with the following indicators:

The candidate appears in the competition with the following indicators:

<b>Indicator</b>	<b>Indicator content</b>	<b>Points Required</b>	<b>Candidate Points</b>
A	Dissertation for the award of "Ph.D."	50	50
B	Dissertation for award of "Doctor of Science"	-	-
V	Habilitation work - monograph	100	100
G	Publications	200	386.32
D	Citations or reviews in scientific publications	100	455
E	Citations or reviews in scientific publications	100	290
<b>TOTAL (A + B + V + G + D + E)</b>			<b>1281.32</b>

The total number of points of Assoc. Prof. Dr. K. Marinov is 1281.32. Scientific indicators by groups correspond (A) or exceed (B, D, D and E) the required minimum for occupying the academic position "Professor" (550 points) at University of Forestry.

## **3. Assessment of the candidate's educational and pedagogical activities (work with students and PhD students)**

The teaching activity of Assoc. Prof. Dr. K. Marinov is transferred to the Department of "Technology and Mechanization in Forestry" at University of Forestry. During the period 2018-2024, classroom employment is within the limits of 354-441 academic hours, and outside classroom employment is within the limits of 103.9-175.4 hours (with the exception of the 2022/2023 academic year, when the candidate is on long-term sick leave and 2023/2024, for which reference was made only for the winter semester).

The candidate leads lectures and exercises in the following academic disciplines:

- Mechanization of forestry works - for the specialty "Forestry", full-time study (third year) and part-time study (fourth year), educational and qualification degree (EKD) "Bachelor";



- Technological design in forestry activity - for the specialty "Forestry", specialization "Forest use and economics of forestry", full-time and part-time study, first year, EKD "Master";
- Mechanization in landscaping and labor protection - for the specialty "Landscape Architecture", full-time study, second year, educational and qualification degree "Bachelor" (hybrid specialty with Mining and Geological University of St. Ivan Rilski, educational and qualification degree "Master").

Assoc. Prof. Dr. K. Marinov participated in the development and updating of curricula in four disciplines: "Mechanization of forestry works", Specialty "Forestry", EKD "Bachelor", full-time and part-time studies (developed in 2004, updated in 2011, 2016, 2017, 2018, 2019, 2021); "Technological design in forestry activity", Specialty "Forestry", specialization "Forest use and economics of forestry", EKD "Master", full-time and part-time education (developed 2004, updated 2012, 2017, 2021.); "Educational practice in forest use and economics of forestry", Specialty "Forestry", specialization "Forest use and economics of forestry", EKD "Master", full-time and part-time education (developed 2010, updated 2016, 2017, 2021); "Mechanization of forestry works", a hybrid specialty with the University of Mining and Geology St. Ivan Rilski, EKD "Master", full-time education (developed 2022).

The applicant's non-academic employment includes 10.4 hours of examinations with students and 50.0 hours of participation in State Examination Boards.

Assoc. Prof. Dr. Konstantin Marinov is the scientific supervisor of two doctoral students in the scientific specialty "Technology, mechanization and automation of forestry and wood harvesting", who completed the studies with the right of defense: M.Sc. Eng. Konstantin Yordanov Kostov with the topic of his dissertation "Investigation of the technological possibilities of rotary machines for soil preparation of areas for afforestation" (2022); M.Sc. Eng. Milen Petrov Ivanov with the topic of his dissertation work "Research of technologies for extraction of seed materials from forest tree species" (2023).

#### **4. Assessment of candidate's scientific, scientific-applied and publishing activities**

General description of the presented materials

Candidate Assoc. Prof. Dr. Konstantin Marinov participated in the competition with:

- Monographs – 1 (habilitation work);
- Studios – 1;
- Textbooks – 3;
- Teaching aids – 3;
- Publications – 36;
- Projects – 9;



#### **4.1 Participation in scientific, scientific-applied and educational projects**

During the period 2011-2023, Assoc. Prof. Dr. Konstantin Marinov participated in two international and 7 national scientific-research and scientific-applied projects and assignments to:

- Scientific Research Fund, Ministry of Education and Science (Contract DNTS/Slovakia/01/8) (2011-2014) (1 project);
- Program for cross-border cooperation between Bulgaria - Serbia (Agreement 2007CB16IPO006-2011-2-27) (2013) (1 project);
- Research Service (RIS) of LTU (2019-2023) (4 projects);
- Educational experimental forestry "Petrohan" (2 projects);
- Northwest State Enterprise - Vratsa (1 project).

He is the head of three research projects at the Scientific Research Sector at University of Forestry.

#### **4.2 Characterization of published scientific results**

The publications can be classified as follows:

##### **By type:**

- Publications in scientific journals – 36 publications;
- Publications in collections of scientific forums - 4 publications;

##### **By significance:**

- Articles in journals without Impact Factor (IF) – 36 articles;
- Articles in journals referenced and indexed in Web of Science (WoS) and SCOPUS – 14 articles;
- Reports in collections of scientific forums - 4 reports, incl. 2 reports in international forums, referenced in WoS and SCOPUS (2 reports), in international forums, not referenced in WoS and SCOPUS (1 report) and Bulgarian forums, not referenced in WoS and SCOPUS (1 report);

##### **Place of publication:**

- Articles in Bulgarian and foreign journals referenced in WoS and SCOPUS - 14 articles;
- Articles in refereed Bulgarian and foreign journals, outside the WoS and SCOPUS database - 26 articles;
- Publications in proceedings of international scientific forums – 3 publications;
- Publications in proceedings of national scientific conferences, sessions and seminars - 1 publication;

##### **Publishing language:**

- In Bulgarian – 22 publications;
- In a foreign language – 26 publications;



**Number of co-authors:**

- Stand alone – 17 publications;
- With one co-author – 16 publications;
- With two co-authors – 9 publications;
- With three or more co-authors – 6 publications.

**4.3 Reflection of Candidate's Scientific Publications in Literature (known citations)**

- Total – 55 citations.

**By type of citations:**

- In scientific journals, referenced and indexed in world-famous databases with scientific information or in monographs and collective volumes - 17 citations;
- In non-refereed journals with scientific review – 36 citations;
- In teaching aids, monographs, dissertations, etc. – 2 citations.

The candidate's citations are distributed in scientific journals (25 citations, 45.5%), collections of scientific forums (28 citations, 50.1%) and monographic editions (2 citations, 3.6%). Sixteen citations were made in some of the most prestigious journals in the field of forest engineering and forest biological science: four citations in journals with IF (Energies, European Journal of Forest Research, Journal of Forest Science), 9 citations in journals with SJR index (Forestry Ideas, Journal of Environmental Treatment Techniques, Journal of Applied Engineering Science, IOP Conference Series: Earth and Environmental Science, Studies in Systems, Decision and Control), and three journal citations from the WoS database without IF (Scientific Papers, Series E: Land Reclamation, Earth Observation & Surveying, Environmental Engineering).

In the professional biography of Assoc. Prof. Dr. K. Marinov, participation in 9 national and international scientific conferences and seminars is noted.

**4.4 Contributions to the candidate's work (scientific, scientific-applied, applied)**

- The scientific production of Assoc. Prof. Dr. K. Marinov concerns a wide range of problems where significant scientific, scientific-applied and applied contributions have been made, which can be grouped into six thematic areas:
- Machines for densification of wood and non-wood forest products;
- Technologies and machines for the extraction of forest seed materials;
- Technologies and machines for the production of forest planting materials;
- Technologies and machines for creating forest crops;
- Technologies and machines for utilization of forest biomass and creation of forest plantations for energy purposes;
- Technologies and machines for wood extraction.

*SCIENTIFIC CONTRIBUTIONS.* In the first direction, scientific contributions include upgrading the theory of movement of material particles along the screw working surface of densifying machines (G7.1, G8.3, G8.4, G8.26), establishment of the physical model for



movement of particles in screw presses for densification of wood and non-wood bulk materials (G7.1, G8.4), derivation of theoretical dependencies for determining the main kinematic parameters of the movement of bulk materials in the screw working bodies of the densifying machines, depending on the speed of rotation of the working bodies and working pressure (D8.26) and development of a methodology for determining the parameters of the movement of dispersed materials in densifying machines with screw-screw working devices (D8.3).

The second direction includes scientific contributions related to the definition of equations for the movement of seeds of forest tree species in the working organs of the dewing machines, determination of the main kinematic and dynamic parameters of their movement along the screw working surface and development of analytical dependencies to determine the main characteristics of seed speed and seed flow when processed with finger de-wing machines (G8.22).

*SCIENTIFIC AND APPLIED CONTRIBUTIONS.* In the first direction, the scientific-applied contributions are related to the development of graphic and grapho-analytical dependencies for determining the movement parameters and the average transport speed of wood particles in the screw mechanisms of the densifying machines, determining the operational performance of the briquette production machines depending on the working pressure and the speed of rotation of the working bodies (G8.3), development of a methodology for determining the length of the press channel of the matrices of the screw presses (G8.4), definition of the working pressure of the screw presses for briquetting of crushed straw and wood for production of briquettes with a certain density (G7.1, G8.4).

In the second direction, the scientific-applied contributions include determining the operational productivity of finger de-wing machines for the extraction of seeds from forest tree species (G8.22), upgrading the management and control system of the technological process in regional forest seed production in Bulgaria. (G8.1), enrichment of the existing knowledge about the physico-mechanical and technological properties of seed materials from the main forest species (white pine, black pine, common spruce, white mulberry) relevant for their processing (G8.2), establishment of the main parameters and functional dependencies in the process of de-winging of white pine seeds with a small unitech de-winging machine (D8.16), development of regression models to determine the influence of the control bodies of the VSS Cleaner & Seed Sizer seed cleaning machine on the qualitative and quantitative parameters of the process in the extraction of seeds from white pine, black pine and common spruce. (D7.12, D8.23, E20.2).

In the fourth direction, the scientific-applied contributions stem from research and analysis of technologies and machines applied at home and abroad for preliminary preparation of forest areas and clearings, and basic soil treatment for afforestation with intensive poplar crops (B3.1, D7. 4, D7.6, D8.19, D8.21, D8.25, E20.1) and technologies and machines for soil preparation of forest areas and clearings for afforestation in the lower forest vegetation belt of the oak forests in Bulgaria (D7.13, D7 .14, D8.13, D8.20).

The scientific and applied contributions in the fifth direction are related to the study of the potential of wood biomass in Bulgaria and Slovakia and the clarification of the main energy characteristics of wood particles (chips, pellets, briquettes) from forest tree species suitable for creating energy plantations in Bulgaria (*Populus x euramericana* clones, *Salix viminalis*) waste



wood from sawmill production in Bulgaria and Slovakia (G7.2, G8.5, G8.6, G8.7, G8.9, G8.10, G8.11, G8.24, E19.1 ).

In the sixth direction, the scientific-applied contributions stem from establishing the performance of a Bobcat TL 470 front-end loader for the technological operations "sorting and ramping" of timber and "loading of timber" on vehicles at a temporary forest warehouse under the conditions of Educational Experimental Forestry " Petrokhan" (D.7.7) and the main operational properties of specialized forestry tractors TAF 690 PE and LKT-81T, the influence of conditions (road slope, course loads, haulage distance) on the working speed and productivity when hauling whole stems and long logs sections of common beech in the Western Stara Planina region and common spruce in the Western Rhodopes region (G7.11, G8.8).

*APPLIED CONTRIBUTIONS.* In the second direction, the applied contributions are related to the development of technological regimes for de-winging of white pine seeds with the small-sized de-winger "Unitech" in the seed harvesting and seed control stations and operation of the wet de-winger BCC Wet Dewinger 800 and the seed cleaning machine BCC Cleaner & Seed Sizer for the extraction of Scots pine, Austrian pine and Norway spruce seeds for accurate seeding for container sapling production at Lokorsko Forest Nursery (G7.12, G8.23).

In the third direction, applied contributions stem from research and analysis of modern structures, equipment and machines used in the production of container saplings and determination of favorable technological parameters of the working environment in greenhouses (E10.1, E22.1, E22.3).

The applied contributions in the fourth direction are related to the finding that in the lower forest vegetation belt, forest cutters for soil preparation of forest areas and clearings provide a higher quality of work, compared to traditional machines used for afforestation (D8.13, D8.20).

In the fifth direction, the applied contributions are related to establishing the relative share of wood used for energy production in Bulgaria, the unutilized wood waste from felling in the country, the reasons for the weaker demand for dendromass technologies in the country (E19.1), clarifying the conditions and potential for creating energy plantations from fast-growing tree species, determining the net calorific value of energy chips and justifying the need to implement modern installations for the use of renewable energy from wood biomass, equipped with mechanized power supply and automatic control ( D8.9, D8.10, D8.11, D8.24, E19.1).

In the sixth direction, the applied contributions include the establishment of the optimal main characteristics (size of sites, slope of the terrain) when using frontal jaw loaders in temporary forest warehouses (D.7.7) and the highest productivity of the tractor TAF 690 PE depending on the slope of the road and the haulage distance in the conditions of the Western Stara Planina is achieved (G7.11).

The report on the contributions of Assoc. Prof. Dr. Konstantin Marinov has been prepared as correctly as possible.

## **5. Assessment of the applicant's personal candidate**

The scientific contributions of Assoc. Prof. Dr. Konstantin Marinov are largely the result of personal efforts, the result of his own experimental activity. The candidate has excellent



engineering knowledge, which allows him to conduct qualitative research in the field of forestry mechanization. In the collective works, the place and the individual handwriting of the candidate clearly stand out.

## **6. Critical remarks**

The publications of Assoc. Dr. Konstantin Marinov are fully supported in scientific and technical terms. References to participation in scientific projects, participation in scientific forums and distribution of citations can be presented in a more systematic way.

## **7. Personal impressions**

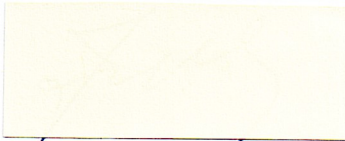
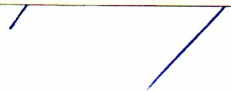
I know Assoc. Prof. Dr. Konstantin Marinov as one of the most respected, competent and correct professors at University of Forestry. His responsible attitude towards teaching activities, administrative talent and teamwork attitude are highly valued by students, teachers and scientists.

## **8. Conclusion**

The candidate for the academic position of "Professor" Assoc. Prof. Dr. Konstantin Ivanov Marinov appeared at the competition with considerable teaching experience and a valuable scientific output. An indicator of the high quality of his scientific research is the significant number of citations in the most renowned scientific journals.

In connection with the above, I propose that Assoc. Prof. Dr. Konstantin Ivanov Marinov, be elected "Professor" in the discipline "Mechanization of Forestry Works" in Professional Direction 6.5. Forestry, scientific specialty "Technology, mechanization and automation of forestry and wood harvesting".

Signature of the reviewer:

Review submitted to: 19 August 2024