# REVIEW

by competition for the academic position of "Associate Professor", at the Institute of Robotics-BAS

in the field of higher education 5. Technical Sciences, Professional Direction 5.1 Mechanical Engineering (Robotic Devices with Application in Medicine), for the needs of the RiMIS section

with the only candidate Assist. Prof. Veronika Ivanova Atanasova-Georgieva, PhD

Reviewer: Assoc. Prof. Galya Georgieva-Tsaneva, PhD, Institute of Robotics-BAS

*(This review was prepared on the basis of Order No. 75/16.07.2025 of the Director of the IR-BAS for determining the composition of the scientific jury.)*

## 1. General information and biographical data

According to the competition announced in the State Gazette No. 39 of 13.05.2025 for an Associate Professor for the needs of the RiMIS section, in the field of higher education 5. Technical Sciences, Professional field 5.1 Mechanical Engineering ("Robotic devices with application in medicine"), the only candidate, Assistant Professor Dr. Veronika Ivanova Atanasova-Georgieva, from the same RiMIS section of the Institute of Information and Communication Sciences of the Bulgarian Academy of Sciences, has submitted documents.

Dr. Veronika Atanasova-Georgieva was born on 28.07.1975 in the city of Sofia. She obtained a Master's degree in Industrial Engineering and Management at the Faculty of Economics of the Technical University - Sofia in 2000. She obtained a Doctorate in Robots and Manipulators in 2020 at the Institute of Robotics at the Bulgarian Academy of Sciences on the topic "Laparoscopic executive instruments for robots". Since 2002, she has been a member of the Central Laboratory of Mechatronics and Instrumentation at the Bulgarian Academy of Sciences, later the Institute of Systems Engineering and Robotics and the Institute of Robotics. From 2002 to 2004, she held the position of engineer. From 2004 to 2011, she held the position of research associate, from 2011 to the present, she is a chief assistant.

## 2. Materials submitted for the competition

As a member of the scientific jury, I have received:

1. A detailed CV according to the European standard. 2. A copy of the diploma for the ONS "Doctor". 3. A list of scientific publications that do not repeat those submitted for the acquisition of the educational and scientific degree "Doctor". 4. A list of inventions and other scientific and applied results. 5. Certified copies of protocols for scientific contribution between the authors of some of the scientific publications. 5. A list of citations. 6. Summaries of scientific publications – in Bulgarian and English. 7. Electronic copies of all scientific publications for

participation in the competition. 8. A detailed report on the fulfillment of the minimum national requirements for occupying the academic position of "associate professor" by groups of indicators for the Institute of Robotics at the Bulgarian Academy of Sciences. 9. A report on the original scientific and scientific and applied contributions. 10. Declaration for a book published before 2018. 11. Declaration that there is no plagiarism proven in the scientific works in accordance with the established procedure. 12. Declaration (Appendix 1) and Declaration (Appendix 2) according to the requirements of the Internal Rules for the Development of the Academic Staff of the Institute of Robotics at the Bulgarian Academy of Sciences. 13. Document for the paid fee to IR-BAS by bank transfer, for the procedure for reviewing the documents and accompanying administrative services and activities. 14. Copy of the announcement from the State Gazette.

I have no comments on the required documents for participation in the competition and their content, according to the regulatory framework of ZRASRB, PPZRASRB and the Regulations for the Internal Procedure of IR-BAS on the conditions and procedure for occupying the academic position "Associate Professor". The procedural requirements for announcing and participating in the competition by the candidate have been met. Ch. Assoc. Prof. Dr. Veronika Ivanova Atanasova-Georgieva meets the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADABRB) and its Implementing Regulations (IPR) for holding the academic position of "associate professor", regulated in Art. 24 (1):

1. Has defended a dissertation on the topic "Laparoscopic executive instruments for robots", as evidenced by diploma No. 001260 dated 19.06.2020 for the award of the ONS Doctor from the Institute of Robotics at the Bulgarian Academy of Sciences.

2. Has held the academic position of "assistant", "assist. Prof." for no less than two years.

3. As an equivalent of a monographic work, has presented 11 publications that are referenced and indexed in a global database, which do not repeat those presented for the acquisition of the educational and scientific degree "doctor".

4. Meets the minimum national requirements under Art. 26, para. 2 and para. 3, and the requirements under art. 26, para. 5.

5. There is no plagiarism proven in accordance with the statutory procedure in the scientific works.

The candidate participates in the competition with a total of 34 works, which do not repeat those submitted for the acquisition of the Educational and Scientific Degree of Doctor. The main works under indicator B were published after the acquisition of the scientific degree, with the exception of 1, which did not participate in the competition for the acquisition of the scientific degree of Doctor. Eleven of the works are reasonably presented as equivalent to a monographic work, of which 1 is with quartile Q2, 2 publications fall into quartile Q3, 4 publications are with quartile Q4 - over 50% of the publications submitted for monographic work fall into the quartile

area. There is a small inaccuracy in determining the points for publication B9, with the total number of points for group B becoming 223 points, which is 2 times above the required minimum of 100 points.

For indicators from group D, 1 book and 22 publications in peer-reviewed journals and/or in refereed editions are presented. The attached is a book published by European University Press printed in 2017 and with a declaration that the publication has been peer-reviewed. Authors' separation protocols have been attached for 5 of the publications. The points for the indicators in this group, after taking into account the percentage according to the separation protocols, are 229.91, which is above the required minimum of 200 points.

A detailed report on 18 citations of the candidate's works, reflected in Scopus, is attached, which brings the candidate 180 points. Of the remaining citations presented, I accept 3, made in journals with scientific review in international editions (D14), which bring the candidate another 6 points. Thus, the points in group D exceed the required minimum of 50 points by more than 3 times.

In addition to the scientific works, the candidate also participates in the competition with 1 recognized utility model. Information on participation in one international project HORIZON 2020 and one national project is presented. Attached are documents for distinction - Award for original scientific development of a young scientist from the Bulgarian Academy of Sciences and the Silk Road Museum IKUO HIRAYAMA with Foundation, Japan Center IKUO HIRAYAMA, Bulgaria and an award from the World Science Federation - in the field of Medicine and Biotechnology in the form of a scholarship.

In conclusion, the candidate has a significant number of works and contributions in the field of robotics and mechatronics with application in various branches of medicine from 2007 to the present; a number of scientific and applied developments related to innovative solutions in the field of robotic devices in medicine, as evidenced by both the utility model and the awards with national and international recognition. The results obtained have been published in a number of articles and reports in our country and abroad. There is a sufficient number of citations in prestigious publications, both by Bulgarian and foreign authors.

From the analysis made in this way regarding the scientometric indicators presented by the candidate, it is established that Ch. Asst. Prof. Dr. Atanasova - Georgieva fully satisfies both the specified minimum national requirements and the specific requirements of the Institute of Robotics at the Bulgarian Academy of Sciences.

**4. Contributions**

The main scientific and applied scientific contributions, which can be determined based on the papers submitted for review, including the candidate's reference to the scientific and applied scientific contributions, are reduced to:

1. A robotic system for analysis and control of the mechanical properties of biological tissues with application in laparoscopic operations is proposed. The system allows determination of the parameter "relaxation time" $\tau$ as a diagnostic indicator and is registered as a utility model (Publications B2, G8.8, E26).

2. An architecture is proposed and a system for collecting, processing and visualizing medical data is implemented, including an operator station and VR/AR applications for training. A model-based approach for design using UML diagrams is presented and a MOSAR environment for data integration is implemented. (Publications B1, B3, B4, B5, B10)

3. A conceptual model and a software-hardware platform for training in minimally invasive surgery (MIS) are proposed. The development includes a virtual environment with 3D visualization, libraries of anatomical organs and Android-based applications for training students and surgeons. (Publications B5, B9, G8.7)

4. An innovative solution for an ECG device for monitoring patients is proposed, applicable also in disasters and accidents. A new communication concept based on uMAC stack is introduced, which allows remote monitoring and integration into robotic systems, as well as AR/VR simulations for training. (Publications B7, G7.1, G8.5)

5. A concept for electronic smart cards for patients is proposed for the purpose of optimizing health data and connecting to the electronic health record system. Upgrading with data from personal portable devices provides better personalization and supports medical staff in decision-making. (Publication B6)

6. A methodological approach for designing laparoscopic robotic actuators is presented. The development includes classification of movements, selection of appropriate mechanisms and design of instruments with proven advantages for minimally invasive surgery. (Publication B11)

7. A device for surgical robots in local tumor therapy is proposed, combining diagnostics of biomechanical properties with UHF-based therapy. The device provides gentle local treatment using an electromagnetic field with pre-programmed parameters and integrates diagnostic and therapeutic functions in one system. (Publications G7.4, G8.1, G8.4)

**5. Application of the candidate's contributions in science and practice**

The scientific papers submitted for participation in the competition are related to innovative solutions for the application of robotic devices in various areas of medicine. The results obtained have found/can find their application in the following areas:

- Robotic system for analysis and control of the mechanical properties of biological tissues with application in laparoscopic operations.
- Design and development of a system for collecting, processing and visualizing data with application in medicine.

- Platform for training in minimally invasive surgery.
- Development of a Wireless mobile ECG device consisting of a measurement and control module.
- Introduction of processor cards to replace health records.
- Device for surgical robots in local tumor therapy.

The contributions in the peer-reviewed papers can be briefly presented as innovative solutions related to the application of robotic devices in various fields of medicine to achieve optimal healthcare.

**5. Critical remarks and recommendations**

I personally know Asst. Prof. Dr. V. Atanasova – Georgieva as a motivated scientist in the field of robotic devices with applications in medicine. I have no critical remarks on the materials presented by the candidate, since they meet all scientometric indicators required by the Regulations for the Implementation of the Law on Robotics in the Republic of Bulgaria and the specific requirements of the Institute of Robotics of the Bulgarian Academy of Sciences. My recommendations to the candidate are related to increasing the publication activity in journals with an impact factor and impact rank.

**6. Conclusion**

The documents presented by the candidate satisfy all the requirements for holding the academic position of "associate professor", according to the Law on the Implementation of the Law on Robotics in the Republic of Bulgaria, the Regulations for its implementation, as well as the Regulations on the terms and procedures for acquiring scientific degrees and for holding academic positions at the Institute of Robotics at the Bulgarian Academy of Sciences. **All this gives me reason to give a positive assessment and I propose to the scientific jury to vote on a proposal to the esteemed Scientific Council of the Institute of Robotics at the Bulgarian Academy of Sciences to elect Assist. Prof. Dr. Veronika Ivanova Atanasova – Georgieva for the academic position of Associate Professor, in Scientific Area 5. Technical Sciences, Professional Field 5.1 Mechanical Engineering (Robotic Devices with Application in Medicine).**

Date 09.09.2025 Signature:

/Galya Georgieva-Tsaneva/