



INSTITUTE OF ROBOTICS – BAS

Section "Sensors and Measurement Technologies in Robotics and Mechatronics"

STATEMENT

for the competition for the academic position of ASSOCIATE PROFESSOR
in the field of higher education 5. Technical Sciences,
professional field 5.2. Electrical Engineering, Electronics, and Automation,
(Additive and Inhomogeneous Structures in Sensor Technology),
announced in the State Gazette, issue no. 64/30.07.2024.

Member of the scientific jury: **Prof. Dr. Eng. Galina Petkova Cherneva**
Candidate: **Dr. Eng. Martin Lachezarov Ralchev**

In the current competition for the academic position of "Associate Professor" in the professional field 5.2 "Electrical Engineering, Electronics, and Automation" (Additive and Inhomogeneous Structures in Sensor Technology), Dr. Eng. Martin Lachezarov Ralchev is participating as the sole candidate.

I. Short biographical data of the candidate

Eng. Martin Ralchev completed his higher education in 2020, earning a Master's degree in "Electrical Power Engineering and Electrical Equipment" from the Technical University of Sofia. He received the educational and scientific degree of "Doctor" in the professional field 5.2 Electrical Engineering, Electronics, and Automation (Elements and Devices of Automation and Computing Technology) in 2024.

Dr. Ralchev's work biography is related to research and development in the fields of sensor technology, robotics, and mechatronics. He holds design qualifications in "Electrical Supply and Electrical Equipment" from the Chamber of Engineers in Investment Design, as well as certificates for acquired skills from training programs at the Institute of System Engineering and Robotics – BAS and SIEMENS – Bulgaria.

From March 1, 2020, to March 1, 2024, Eng. Martin Ralchev served as an Assistant at the Institute of Robotics – BAS.

He has a good command of the English language and possesses strong computer skills, using specialized software products such as AUTOCAD, MATLAB, LABVIEW, DIALUX 4.13, and others.

II. Characteristics of the candidate's scientific and applied scientific output

For participation in the competition, Dr. Ralchev has submitted a total of 33 scientific works for review, including:

- 10 publications published in journals that are peer-reviewed and indexed in globally recognized scientific information databases (Scopus, Web of Science), equivalent to a monograph on the topic "Additive Sensor Systems with Applications in Electrical Engineering" (indicator B4);
- 16 publications published in journals that are peer-reviewed and indexed in globally recognized scientific information databases (Scopus, Web of Science) - indicator G7;
- 7 publications published in non-refereed journals and conference proceedings with scientific peer review - indicator G8.

All publications are in English.

All publications are co-authored, with the candidate being the first author on 9 of them and the second author on 18.

Among the publications are reports presented at international scientific conferences under the aegis of IEEE and indexed in Scopus – "ELMA," "SIELA," "BulEf," International Magnetic Conference,

International Scientific Symposium on Metrology and Metrology Assurance, and others. Six of the publications are indexed in Scopus and Web of Science, and one publication is in Q4, with an SJR of 0.147 (Lecture Notes in Electrical Engineering).

All scientific works have been used solely for the current competition.

A total of 28 citations have been presented in scientific publications that are peer-reviewed and indexed in Scopus.

Dr. Martin Ralchev's research work is also represented by participation in 3 national research projects relevant to the competition, 4 recognized inventions with patents, and 4 filed patent applications (indicator E). Although this indicator is not mandatory according to the minimum national requirements for the academic position of "Associate Professor," the presented materials and contributions demonstrate the rich developmental activity and practical realization of Dr. Ralchev's research.

The performance of the main indicators for the field 5. "Technical Sciences" is presented in Table 1.

All publications have theoretical and practical significance, related to the current competition for "Associate Professor" and the professional field 5.2 Electrical Engineering, Electronics, and Automation.

Table 1

Group of Indicators	Minimum Number of Points	Number of Points of the Candidate	Number of Points for the Main Indicators from the Group
A	50	50	№1660/29.07.2024Г. - 50
B	100	165	B4. 165
Г	200	262,8	Г7. Scientific publications in journals that are peer-reviewed and indexed in globally recognized scientific information databases - 206,2
			Г8. Scientific publications in non-refereed journals with scientific peer review or in edited collective volumes - 56,6
Д	50	280	Д12. Citations in scientific publications that are peer-reviewed and indexed in globally recognized databases - 280
Total	400	757,8	

I consider the publication and research activities of Dr. Martin Ralchev to be fully sufficient in volume, of a high scientific level, and sufficiently promoted both nationally and internationally. The evidence presented shows that it exceeds (757.8 points) the national requirements (400 points) for the academic position of "Associate Professor" in professional field 5.2 "Electrical Engineering, Electronics, and Automation." Taking into account the evidence presented for indicator E, the fulfillment of the minimum national requirements is nearly threefold.

III. Main contributions to the candidate's scientific and applied scientific activities

The main scientific and applied contributions of the candidate in the presented publications for the competition can be classified as "demonstrating with new means essential new aspects of already existing scientific fields, problems, theories, hypotheses" and "creating new classifications, methods, constructions, technologies."

Among the more significant contributions of Dr. Ralchev are:

- Proposed new means and sensors based on the Hall element and the developed methodologies for data processing and analysis using them (B4-1, B4-2, B4-3, G8-2, etc.);
- Identified and studied characteristic electrical and acoustic parameters of arc discharges (G7-3, G7-4, G7-5, G7-10, etc.);
- Developed and verified innovative methods in 3D printing technology (G7-6, G7-7, etc.).

The functionality of the designed sensors and developed methods has been experimentally confirmed. Dr. Ralchev offers concrete solutions to many practical problems. Confirmatory results for the formulated claims have been obtained in several publications.

IV. Significance of the contributions to science and practice

The significance of Dr. Ralchev's contributions to science and practice is indisputable. A large percentage of his scientific developments have proven their effectiveness and quality in the study of real objects. His participation in numerous research projects and the multitude of inventions are evidence that he is a sought-after and valued researcher, capable of solving a variety of engineering tasks.

I believe that the presented contributions are the personal work of the candidate for associate professor.

V. Personal impressions of the reviewer

I have known Dr. Ralchev from his presentations at various scientific forums. Both then and through the documents he presented for the competition, he stands out for his impeccable work and conscientious fulfillment of his professional commitments. Dr. Ralchev is a well-prepared professional with a high level of research and implementation activities.

VI. Critical remarks and recommendations

I have no critical remarks regarding the presented materials for participation in the competition. They are sufficient to assess the research activities of the candidate.

VII. Conclusion

Based on my review of the presented scientific works, the contributions contained within them, and the fulfillment and exceeding of the minimum national requirements as well as those of the Development of Academic Staff Act (ZRASB), the Regulations accompanying the law, and the Internal Rules for the Development of Academic Staff at the Institute of Robotics at BAS, I find it reasonable to propose Dr. Eng. Martin Lachezarov Raychev for the academic position of "Associate Professor" in professional field 5.2 Electrical Engineering, Electronics, and Automation (Additive and Inhomogeneous Structures in Sensor Technology).

Date: 16.10.2024

Member of the Scientific Jury:.....
/ Prof. Dr. Eng. G. Cherneva /