

SCIENTIFIC OPINION

by Prof. Ivaylo Ivanov Atanasov, DSc. (Eng.), Technical University of Sofia,
regarding the materials submitted for the competition for the academic position of "Professor" at the
Technical University of Gabrovo,

Higher Education Area: 5. Technical Sciences,

Professional Field: 5.3 Communication and Computer Engineering,

Specialty: "Automated Information Processing and Control Systems."

Assoc. Prof. Rosen Stefanov Ivanov, PhD, Eng. is participating as a candidate in the competition for the position of Professor, announced in the *State Gazette* (Issue No. 61 of July 3, 2026) and on the website of the Technical University of Gabrovo, to meet the staffing needs of the "Computer Systems and Technologies" Department within the Faculty of Electrical Engineering and Electronics.

1. Overview of the content and results in the submitted works

The sole candidate in the competition is Assoc. Prof. Eng. Rosen Stefanov Ivanov, PhD, Eng.

All documents required by the Act on the Development of Academic Staff in the Republic of Bulgaria have been submitted for participation in the competition, namely: a successfully defended doctoral thesis; 12 sole-authored publications indexed in Scopus and Web of Science, 6 of which are in journals with an impact factor; a published monograph not previously used for another habilitation procedure; 6 publications indexed in Scopus and Web of Science (1 in a journal with impact rank; 5 co-authored by two authors and 1 by three authors); 17 publications in peer-reviewed journals not indexed in Scopus/Web of Science (12 sole-authored, 4 co-authored by two authors, and 1 by four authors); 127 citations of the candidate's publications submitted for the competition; 34 reviews for journals with impact factor; supervision of 1 successfully defended PhD student; participation in 5 national scientific and educational projects; leadership of 5 institutional scientific or research projects; and 5 textbooks and 1 study aid.

Table 1 summarizes the comparison between the minimum national requirements for the academic position of "Professor" and the candidate's achievements.

Table 1. Minimal national requirements for the academic position of "Professor" and the candidate's achievements

Indicator Groups	Indicator	Minimal national requirements	Achieved by the candidate
A	A.1	50	50
B	B.2	-	-
C	C4	100	720
D	D.5, D.7, D.8	200	428.33
E	E.12, E.13	100	1610
F	F.17, F.23, F.24	150	410

The candidate's research is focused in three areas. One of the areas includes research related to outdoor navigation for mobile devices with limited resources and for people with impaired vision. Early developments integrate GPS with mobile networks for automatic vehicle tracking, speed control and voice notifications. Based on this, a Java application for blind was created, which supports

external Bluetooth GPS, voice control in Bulgarian and SOS mode. It implements a Kalman filter guidance algorithm that minimizes GPS errors and corrects the route in real time. In the meantime, data optimization methods have been developed: the original online trajectory simplification algorithm adapts to speed and reduces GPS points about 15 times, and its next modification compresses the data over 30 times. It automatically detects critical points and allows direct navigation without prior route conversion. In the field of outdoor navigation and positioning systems, an accessible indoor navigation and positioning system with Bulgarian voice guidance has been developed to help the visually impaired to make mental maps. The system uses building modelling, building information models (BIM) and a three-level route management and obstacle avoidance strategy. A hierarchically directed multigraph algorithm efficiently finds paths in multi-storey buildings faster than Yen's algorithm. Furthermore, the micro-localization approach combining BLE beacons, NFC tags and BIM achieves sub-meter accuracy and precise sensor placement. In the area of contextual, IoT-based and personalized systems and services, research is focused on the development of intelligent systems with IoT and artificial intelligence applicable in museums, healthcare and human environment. In the context of open-air museums, mobile services with NFC and tactile interface have been created for the visually impaired, providing personalized museum content. For healthcare applications, cloud platforms and microservices have been developed with the ESP32 low-power microcontroller for real-time pregnancy tracking and drug compliance monitoring.

2. General overview of the candidate's activities

2.1. Teaching and pedagogical activities (work with students and doctoral candidates)

The candidate conducts classes for Bachelor's degree students at TU-Gabrovo in the following subjects: Internet Programming; Non-relational Databases; Computer Organization; Mobile Application Programming; and Programming for Distributed Environments. He also teaches two courses within the Master's degree curriculum: Mobile Internet Systems and Knowledge Discovery from Data. He has authored five textbooks and one study guide for the courses he teaches. He has supervised one doctoral candidate who successfully defended her thesis.

2.2. Scientific and applied research activities

The candidate has participated in four institutional scientific and educational projects funded by TU-Gabrovo and one research project funded by the Scientific Research Fund of the Ministry of Education and Science. He has served as the principal investigator for five research projects funded by TU-Gabrovo.

3. Contributions (scientific, scientific-applied, and applied). Significance of the contributions for science and practice

The presented scientific and scientific-applied contributions encompass three key areas in the development of modern technologies. First, in the field of human-computer interaction, an innovative tactile mobile interface utilizing NFC has been introduced to facilitate the orientation of visually impaired individuals within the physical environment. Second, methods for the intelligent and personalized presentation of cultural heritage information in museums have been modernized through Internet of Things (IoT) and geofencing technologies. Third, a comprehensive architectural framework for real-time physiological data analysis in healthcare has been developed, capable of generating predictive medical alerts. An energy-efficient optimization model for ESP32-based peripheral devices has been created, featuring an intelligent sleep mode that ensures an optimal balance between continuous health monitoring and low battery consumption.

The applied contributions consist of the development and deployment of four innovative software and hardware solutions in real-world environments, aimed at improving healthcare, social accessibility, and cultural tourism. In the realm of accessibility, a mobile service for the visually impaired was created and tested, receiving high ratings for its usability and practical utility. For the cultural sector, intelligent museum systems were developed to enhance visitor engagement by

delivering personalized content based on location and individual preferences. In the pharmaceutical sector, a functional web service, featuring a RESTful API and a NoSQL database, has been developed to check drug compatibility and prevent adverse interactions in real time. Finally, to support healthcare, a functional system for proactive pregnancy monitoring has been built, combining low-cost IoT hardware with a cloud-based software dashboard to provide medical staff with early warnings regarding high-risk symptoms.

4. Assessment of the candidate's personal contribution

The candidate demonstrates an exceptionally high level of personal contribution and maturity, fully commensurate with the academic rank of "Professor." He is the first author on 88.57% of the publications (31 out of 35) and authored 68.57% of them independently (24 items), which attests to his ability to conduct independent research. His scientific output enjoys high international visibility—more than half of the works are indexed in prestigious global databases, six articles have an impact factor, and fourteen were published abroad, confirming the world-class quality and international relevance of his research.

5. Critical remarks and recommendations

There are no critical remarks that would diminish the value of the theoretical and practical work presented by the candidate. The scientific publications are highly impactful and clearly reflect his personal contribution.

I recommend that the candidate channel his extensive research experience into mentoring doctoral students and young colleagues, thereby establishing his own research school within the department.

6. Personal impressions

I have worked with the candidate on a research project funded by the National Science Fund. Throughout the project's implementation, our collaboration was characterized by a high level of professionalism, excellent coordination, and strict adherence to the deadlines and milestones outlined in the work program.

7. Conclusion

In view of the above, I recommend that Assoc. Prof. Rosen Stefanov Ivanov, PhD, Eng. be appointed to the position of Professor in the field of higher education 5. Technical Sciences, professional field 5.3 Communication and Computer Engineering, specializing in "Automated Information Processing and Control Systems."

15.10.2026

Member of Jury:

Prof. Eng. Ivaylo Atanasov, DSc., PhD