

Review

in a competition for the academic position of „Associate Professor”

In the professional field 5.3 Technical Sciences, Communication and Computer Engineering (Microwave Engineering and Communications) for the needs of Sofia University „St. Kliment Ohridski” (Sofia University), Faculty of Physics, announced in the State Gazette, issue 21 of 15.03.2022

The review was prepared by Assoc. Prof. Dr. Emil Emilov Vladkov, Faculty of Physics, Sofia University „St. Kliment Ohridski” in his capacity as a member of the scientific jury of the competition according to Order № RD-38-198 / 27.04.2022 of the Rector of Sofia University

For participation in the announced competition has submitted documents only one candidate Ch. Assistant Professor Dr. Hristomir Hristov Yordanov, Lecturer in the Department of Technology and Management of Communication Systems at the FTC of TU-Sofia.

I. General description of the submitted materials

1. Candidate data

The documents submitted to me for consideration of the competition comply with all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and its Implementing Regulations and the Regulations on the Terms and Conditions for Acquisition of Scientific Degrees and Academic Positions at Sofia University „St. Kliment Ohridski”.

Ch. Assistant Professor Dr. Hristomir Yordanov has presented a complete list of his scientific works, which includes a total of 38 publications. He participated in the competition with 22 titles, 10 of which are in authoritative publications, referenced and indexed in world-famous databases of scientific information (group B, according to the minimum requirements). 12 of the publications are assigned to the group of indicators Γ , including one book based on his dissertation, 5 publications in refereed editions and 6 publications in non-refereed journals with scientific review. In addition, the candidate has submitted 2 official notes for internship at the Technical University and for workload for the last school year. The necessary diplomas for master's, doctoral and current academic positions are also presented.

2. Details of the candidate

Hristomir Yordanov graduated from the American College in Sofia, after which he graduated with a bachelor's degree in Radiocommunications from the Technical University of Sofia. He continued his education at the Technical University of Munich in Germany, where he graduated with a master's degree in microwave engineering. 2011 he obtained a PhD degree at the Technical University of Munich with the dissertation "Wireless and wired communication in and between integrated circuits"

Hristomir Yordanov's professional experience is very rich. He began his career as a design engineer in private business, both in Bulgaria and in Germany. His scientific career started at the Institute of High Frequency Engineering at the Technical University of Munich. In 2014 he started working as an assistant at the Technical University of Sofia, where he still works as an academic „chief assistant”. In the meantime, he became assistant dean for research at the Faculty of German Engineering. In parallel, Hristomir Yordanov works on various projects at the NIS of TU and private laboratories, and is also a guest researcher in the Fulbright program, where he deals with one of the main topics of his work - integrated antennas.

3. General characteristics of the scientific works and achievements of the candidate

Hristomir Yordanov's scientific activity fully corresponds to the focus of the competition. Its main topic - wireless antennas and communications for digital data exchange in integrated circuits is covered by the profile of the competition Communication Technology. As part of the required documents for the competition, the candidate has presented in tabular form the coverage of the various criteria according to the requirements set in the Act for holding the scientific position „Associate Professor” (under Article 2b, paragraphs 2 and 3 of Law on the Development of the Academic Staff in the Republic of Bulgaria). I find full coverage of the minimum requirements, namely:

- A) group of indicators A: dissertation for the scientific degree PhD - 50 points
- B) group of indicators B: 10 works in publications referenced in world-famous databases - 135.57 points with a minimum required 100
- C) group of indicators Г: published book, which is not presented as a main habilitation paper + 12 publications in refereed and non-refereed journals - 215.71 points with a minimum required 200
- D) group of indicators Д: 6 citations of one of the articles - 60 points for the required 50

The presented scientific papers do not repeat those of previous procedures for acquiring a scientific degree and academic position. There is no legally proven plagiarism in the scientific papers submitted at the competition. The strong activity of the candidate in research projects financed by external organizations, as well as in private business, also makes a positive impression.

4. Characteristics and evaluation of the teaching activity of the candidate

From the presented sample for the teaching load of Ch. Assistant Professor Hristomir Yordanov for four consecutive academic years it is clear, that there ist overfulfillment of the individual standard of 300 hours, respectively with 508, 237 and 205 hours. For the current year, 586 hours have been taken so far as the report is issued. They are distributed both in lectures and in laboratory exercises. The workload report is too encrypted to be particularly useful for

understanding which subjects the candidate is teaching, but it is clear that the classes are conducted in German. Unfortunately, the candidate did not submit a separate report on the subjects.

From the report on his scientific contributions it is clear that from 2021 Hristomir Yordanov is also the head of a doctoral student. There is no reference for the graduates led by the candidate, but it is obvious that with such a workload and even the guidance of a doctoral student, he has enough experience to start teaching as an associate professor at the Faculty of Physics at Sofia University.

5. Content analysis of the scientific and scientific-applied achievements of the candidate contained in the materials for participation in the competition

The scientific activity of the candidate in the period from his master's thesis in Germany to the present covers a variety of topics on which are made and the publications with which he participates in the competition.

The first topic concerns numerical methods for modeling electromagnetic fields with a view to their use in optimization problems. The main contributions on this topic, obtained using full-wave models and half-wave simulations, are presented in the article $\Gamma 1$.

The second topic already marks the main activity of the candidate, namely the optimization of communication in and between integrated circuits. His research focuses on chip-integrated antennas, as well as the use of metal structures already present in the chip as radiating elements. The activity is described in the book $\Gamma 2$, published on the basis of his doctoral dissertation, as well as in articles B3 and $\Gamma 4$. Hristomir Yordanov is also working on confirming the validity of the theory of approximation of the elements of an antenna array with isotropic radiators, and the contributions in this area are described in Article B1.

After starting work at the Technical University as a fellow of the Marie Curie program of the EU, the candidate continues his work on the topic of communication of digital signals in IC. He investigates methods for reducing substrate losses using high-resistance silicon substrates or thin substrates. The result are the works described in Articles $\Gamma 5$, $\Gamma 6$ and $\Gamma 7$. He also investigates the interference caused by transistor switching when using power buses as antennas. This is also summarized in works B8 and $\Gamma 8$. At the same time, Hristomir Yordanov collaborated with his colleagues from Munich in the development of equivalent circuits with non-distributed parameters in the synthesis of integrated antennas. This activity is described in Articles B2, B4, B5 and $\Gamma 3$. Article B9, which examines integrated antennas, is published in an 1,738 impact factor magazine (IEEE Transactions on Components, Packaging and Manufacturing Technology) and is of increasing interest, with 6 citations in authoritative international publications and conference proceedings.

Apart from this main direction in the candidate's activity, within the framework of his cooperation with the industry, he is also engaged in the development of measuring equipment (hygrometers), processing of radar signals with neural networks and calibration of phased array antennas. The results are B9, $\Gamma 9$, $\Gamma 10$, $\Gamma 11$ and $\Gamma 12$ papers.

What is impressive is that in 14 of the papers (22 in total) with which Hristomir Yordanov applied for the position of associate professor, he has a leading position in co-authorship, which definitely emphasizes his significant scientific potential with a strong emphasis on applied work.

6. Critical remarks and recommendations

I have no remarks on the scientific works. My main criticism is regarding the insufficient materials provided for the candidate's educational activity (only the workload report).

7. Personal impressions of the candidate

I have no personal impressions of the candidate.

8. Conclusion on the application

I got acquainted in detail with the materials of the candidate Hristomir Yordanov presented in the competition and made an analysis of their significance and the scientific and scientific-applied contributions contained in them. **I confirm** that they meet the requirements of Law on the Development of the Academic Staff in the Republic of Bulgaria and the regulations for its implementation, as well as the relevant regulations of Sofia University „St. Kliment Ohridski” for holding the academic position of „Associate Professor” in the scientific field and the professional direction of the competition. The candidate meets the minimum national requirements in professional field 5 - Technical Sciences. No plagiarism was found in the scientific papers submitted at the competition. **I give a positive assessment of the candidacy of Dr. Hristomir Yordanov.**

II. OVERALL CONCLUSION

Based on all that has been said so far, **I recommend** to the scientific jury to propose to the competent selection body at the Faculty of Physics of Sofia University „St. Kliment Ohridski” to **elect Dr. Hristomir Yordanov to take the academic position of “Associate Professor” in the professional field 5.3 Technical Sciences - Communication and Computer Engineering.**

20.06.2022

The review was prepared by:

/ Assoc. Prof. Dr. Emil Vladkov /