# R E V I E W

at the Contest for Lending the Academic Credibility "Associate Professor"
by professional field 5.2. **Electrical engineering, electronics and automation**,
specialty – "**Conversion Engineering**", to the Department of Electronic Engineering and Microelectronics at the Faculty of Computer Engineering and Automation,
Announced in the State Gazette №93 / 26.11.2019
with the candidate **Dr. Eng. Angel Stanimirov Marinov**
Member of the Scientific Jury: **Nikolay Lyuboslavov Hinov, Doctor, Associate Professor**

## 1. Brief biography and background

The competition for occupation of the academic position "Associate Professor" was announced on the proposal of the Departmental Council of the Department of Electronic Engineering and Microelectronics, confirmed by a decision of the Faculty Council of the Faculty of Computer Engineering and Automation of Technical University of Varna and later by the Academic Council of TU Varna- It's safe. The only candidate to submit the application is Dr. Eng. Angel Stanimrov Marinov. After consideration of the submitted documents, the applicant is admitted to the competition.

Dr. Angel Stanimirov Marinov was born on February 28, 1984. He graduated from the Technical College of Mechanical Engineering and Electronics, Varna in 2002. He studied at the Technical University of Varna from 2002-2007, receiving a bachelor's degree and a master's degree in Electronics. Since 2008, he is a full-time Ph. D student at the Department of Electronic Engineering and Microelectronics at the Technical University of Varna, majoring in Electronics. He defended his dissertation for the doctorate degree in 2012 on the topic: Power electronic converters in combined heat and power system.

The teaching activity of the applicant is as follows: Assistant in the Department of Electronic Engineering and Microelectronics (until 2016); Assistant Professor, College of TU-Varna (March 2016 to January 2017); Associate Professor, College of TU-Varna (January 2017 to September 2017).

In addition to his research work, the applicant has carried out administrative and organizational activities in the department of Electronic Engineering and Microelectronics and the University: Responsible for foreign language training at the department; Master in charge of the department; Responsible for ERASMUS activities at the department; Expert at the Center for National and International Projects at TU-Varna.

## 2. Summary of the works presented in the application

In order to participate in the competition, the applicant submitted a list of the titles of **49** scientific publications (12 articles and 37 reports), 2 study aids, a citation reference, lectured subjects and a list of participation in 15 research projects funded by a national research fund and other public funds is Bulgaria and various operational programs of the European Union, including the Seventh Framework Program and other international programs.

There are 24 publications in total indexed in Scopus and Web of Science. Six of these works are standalone. The candidate participates in the competition with 13 publications equivalent to monograph work, indicator B. Quotations of publications (within the meaning of the law for the development of the academic staff in the Republic of Bulgaria) are presented - 17 in total, including those indexed in Scopus (Elsevier) and / or in Web of Science (Thomson Reuters) are 8.

After reviewing the lists provided, I accept for review all of the applicant's work. Upon a detailed examination of the papers submitted for participation in the competition, including the publications, citations and other activities of the applicant, I present the following summary of the fulfillment of the conditions for acquiring an academic position „Associate Professor" by groups of indicators for the field of higher education „5. Technical Sciences", Table 1.

Table 1. Report on the fulfillment of the conditions for acquiring an academic position "Associate Professor" by groups of indicators for the field of higher education „5. Engineering"

| A set of metrics | Content by metrics | Minimum requirements for acquisition of Associate Professor | Points Dr. Eng. Angel Stanimirov Marinov |
|---|---|---|---|
| **А** | **Indicator 1** | 50 | **50** |
| **Б** | **Indicator 2** | ------- | -------- |
| **В** | **Indicator 3 or 4** | 100 | **227** |
| **Г** | **Sum of indicators 5 to 11** | 200 | **408** |
| **Д** | **Sum of indicators 12 to 15** | 50 | **100** |
| **Е** | **Sum of indicators 16 to 28** | ------ | ------ |
| **Ж** | **Indicator 29** | 30 | **91** |
| | **In total** | 430 | **785** |

**After comparing with the minimum requirements for acquiring the academic position of Associate Professor and the applicant's points, the conclusion is that Dr. Eng. Angel Stanimrov Marinov fully covers the national requirements for occupying the academic position of Associate Professor, for the field of Technical Sciences in higher education, enshrined in Art. 2b of the Law for the Development of the Academic Staff in the Republic of Bulgaria and the Minimum Requirements, in accordance with the Rules for the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at the Technical University of Varna.**

**3. General characteristics of the applicant's research and applied activities**

The applicant has submitted a reference for participation in 15 research projects in the period 2008-2017, and they are classified as follows: six internal for Technical University of Varna, three with national funding Research Fund, three with financing under operational program „Human Resources Development", one under the EU's Seventh Framework Program and two funded under other international programs.

The applicant's research and application activities can be summarized in the following main areas:

- study of power electronic converters and systems of power electronic converters in systems for decentralized energy production, and in particular of photoelectric and wind generators;
- management of energy flows in systems for decentralized energy production and implementation of improved solutions in the field of smart energy systems;
- study of power electronic converters for the implementation of highly efficient control of electric machines for use in electric vehicles.
- new and improved software technologies and solutions using modern information and communication technologies for the implementation of e-learning in the field of electronics;
- analysis, modeling and development of magnetic components, power circuits and algorithms for the control of electronic converters used in the implementation of high-efficiency electrotechnical devices.

**My overall assessment of the applicant's research and application is very good.**

**4. Evaluation of the applicant's teaching and pedagogical activity**

The candidate has delivered lectures, laboratory and seminar exercises for full-time and part-time students in Bachelor's and Master's Degree Programs in the Department of Electronic

Engineering and Microelectronics in Bulgarian and English in the following subjects: „Renewable energy systems“, „Wind power“, „Conversion engineering“, „Industrial electronics“, „Power electronic devices“, „Power electronic converters agents used for renewable energy and cogeneration systems“ and „Analysis, modeling and design of power electronic converters“.

Dr. Marinov has managed 48 successfully defended the graduate student and has reviewed 44 diploma papers.

The participant of the competition is a co-author of teaching aids on „Materials and Components in Electronics“ and „Electronic Devices in Renewable Energy Sources“, as well as 7 training programs for training in various specialties.

The reference to the published teaching aids is a good certification for his work as a teacher, and also a prerequisite for my future academic development.

**My overall assessment of the applicant's pedagogical preparation and activity is very good.**

**5. Main scientific and applied-science contributions**

With regard to publications, the equivalent of a monographic work:

The results presented are mainly related to the modeling and automated design of power electronic devices for various purposes – electro-technology, charging regulators, systems for decentralized electricity production and others. On the basis of existing and developed models, it is made: analysis of losses and improvement of cooling in semiconductor elements and optimal design at a given target function. The models are verified using different voltage probes and innovative methods for encoding sensor information. Improved algorithms are used to accelerate the computational procedures to generate software code for numerically solving systems of differential equations when simulating thermal processes. By using a fuzzy logic algorithm, indirect recognition of the energy consumption of home appliances is made as part of the concept of smart homes and grids.

In connection with other submitted publications:

- Improving the performance of power electronic converters by: reducing losses in building blocks, using new materials and structures, optimizing the selection of semiconductor switches, limiting the starting current, implementing improved current protection, and using modern means of collection and processing information from sensors and sensor networks;
- Modeling of polymer piezoelectric elements (PPE) for the needs of: energy collection system and measuring devices;
- Development of power electronic converters with industrial applications and various electro-thermal devices, using improved design methodologies, new materials and computer modeling tools;
- Use of innovative approaches in the development of complex educational content based on modern information and communication technologies;
- Increasing the productivity of renewable energy sources through the use of: high-efficiency electric machines, improvement of existing infrastructure, software implementation of mathematical models, innovative systems for electronic converter control and impact assessment of meteorological indicators;
- Study of smart metering systems based on self-powered sensors and sensor networks, with various applications such as medical diagnostics, energy, e-learning;
- The synthesis of simplified computational procedures for the numerical modeling of power electronic converters and systems and the determination of losses in semiconductor switches.

**6. Importance of the contributions for the science and engineering practice**

As a result of the analysis of the applicant's publication activity and its corresponding reflection by quoting from other authors, it should be concluded that he is known to the scientific community in the field of competition.

For participation in the competition, Dr. Marinov presented a list of 17 citations in scientific publications in the country and abroad of 14 of his works. A check on the Scopus database revealed that the applicant had a Hirsch index h = 4.

The importance of contributions to the practice can be indirectly judged by the active involvement of Dr. Marinov in research projects, which was discussed in section 2 of the review.

In view of the above, it is evident that the quantitative indicators of the criteria for occupation of the academic position of Associate Professor in the field of higher education "Technical Sciences" have been met.

**7. Critical remarks and recommendations for the applicant**

My main comments are related to the quality of the prepared materials for the competition. Already in the application to the Rector for participation in the competition, I quote: “in the professional field “Conversion Engineering”. In addition, the contributions should be specific and clear and summarize the applicant's overall activities.

I recommend that Dr. Marinov publish in Impact Factor and Impact Rank scientific journals, as well as in indexed scientific literature databases (SCOPUS, WoS). This will improve the citation and scientific recognition of both the applicant and the teams in which he works.

**8. Personal opinion and statements of the reviewer**

I have personal opinions of the applicant's research and know some of the projects he has worked on. I was a reviewer of his Ph. D dissertation and was very impressed with both his theoretical background and his research achievements. From the materials submitted for review, it is clear that the applicant is an active participant in the construction and renovation of the material and technical base of the Department of Electronic Engineering and Microelectronics at the Technical University of Varna. He is also an active participant in the research and application activities of the University.

**9. Conclusion:**

**The submitted scientific production and preparation of the applicant's documents are in accordance with the law for the development of the academic staff in the Republic of Bulgaria and the Rules for its application in the part for acquiring the academic position „Associate Professor“. The applicant's work and contributions are his main business and are completely sufficient for the award of the academic position of „Associate Professor“.**

**On the basis of my acquaintance with the submitted scientific papers and their summaries, the applied scientific and scientific contributions and the fulfillment of the minimum national requirements, I find it reasonable to propose Dr. Angel Stanimrov Marinov to occupy an academic position of „Associate Professor“ in the professional field 5.2 Electrical Engineering, Electronics and Automation at the Department of Electronic Engineering and Microelectronics, Faculty of Computer Engineering and Automation of Technical University of Varna.**

09.03.2020 г. Reviewer:

/ Assoc. Prof. Ph.D Nikolay Lyuboslavov Hinov /