

OPINION

**Authored by Prof. Georgi Lyubenov Iliev, PhD, Technical University – Sofia,
Concerning scientific works submitted for participation in competition
for awarding the academic position of “Associate Professor”
in the field of higher education 5. Technical Sciences,
professional field 5.3. “Communication and Computer Engineering”,
scientific specialty “Communication Networks and Systems”,
 (“Wireless Communications and Broadcasting”, “Security equipment”)**

In the competition for „Associate Professor“, announced in the State Gazette, issue 68/31.07.2020 and on the website of TU – Gabrovo for the needs of the Department of “Communication Equipment and Technologies” at the Faculty of Electrical Engineering and Electronics as a single candidate participates **Ch. Assist. Prof. Krasen Kirov Angelov, PhD** – Technical University of Gabrovo.

1. An overview of the content and results of the submitted works

The candidate in the competition Krasen Kirov Angelov, PhD participated with a total of 42 publications (of which 10 scientific publications, equivalent to a monographic work and 35 - outside the equivalent of a monographic work), distributed as follows:

- 4 are published articles in international journals referenced in SCOPUS/WOS, 1 of which is in a journal with Impact factor (scientific and research journal “Elektronika ir Elektrotechnika”, published by the University of Technology in Kaunas, Lithuania);
- 9 are published reports at international conferences, published in referenced and indexed world-famous databases of scientific information (SCOPUS);
- 29 are in editions from the National reference list of Bulgarian scientific publications with scientific review (of which 5 articles in journals and 24 reports at scientific conferences);

4 of the candidate's publications are with a single author; 2 are with one co-author; 22 are with two co-authors and 14 are with three co-authors. The candidate is on the first place as an author in 19 publications and on the second – in 12. The candidate is a co-author in 3 published textbooks.

The works submitted for the competition are grouped in four thematic areas: wireless communications and broadcasting (B.4.1, B.4.4, B.4.5, Г.7.1, Г.8.3, Г.8.14, Г.8.29); optical communication networks (B.4.2, B.4.7, B.4.8, B.4.9, Г.8.1, Г.8.2, Г.8.4, Г.8.6, Г.8.7, Г.8.13, Г.8.15); systems and services in satellite and cable television networks (B.4.3, Г.7.3, Г.8.8, Г.8.9, Г.8.10, Г.8.12, Г.8.16, Г.8.17, Г.8.18, Г.8.19, Г.8.20, Г.8.21, Г.8.22, Г.8.23, Г.8.24, Г.8.25, Г.8.26, Г.8.27, Г.8.28); reliability and fault tolerance of communication networks (B.4.6, Г.8.11).

The author's reference of noticed citations of the works on the competition contains a total of 10 citations of 9 publications, 5 of which are referenced in SCOPUS.

2. General characteristics of the candidate's activities

2.1. Educational and pedagogical activity (work with students and postgraduate students)

Krasen Kirov Angelov, PhD is a lecturer at the Technical University of Gabrovo, Faculty of Electrical Engineering and Electronics, Department of Communication Engineering and Technology since 2008 and has held the following positions: Assistant Professor from 2008 to 2016 and Chief Assistant Professor – from 2016 until now.

During the period from 2016 to 2020, the average annual classroom employment of the candidate is 673 hours. During the same period, the candidate is a lecturer in 4 disciplines in the Bachelor's degree – “Wireless Communications and Broadcasting”, “Security Equipment”, “Audio and Video Equipment” and “Cellular Communications”, and 1 discipline in the Master's degree – “Information Technologies in Communications”.

The educational and pedagogical activity of Krasen Angelov, PhD includes: development of 5 curricula; supervision of 50 graduating students; supervision of students for participation

with 8 papers in the Student Scientific Session of TU-Gabrovo, as well as student teams with 5 participations with innovative developments in the national youth scientific and technical forums “Youth Technical Creativity” – Gorna Oryahovitsa, “Academy of Innovation: IDEAS 2018” – Sofia and in “Gabrovo Innovation Camp 2018” – Gabrovo.

2.2. Scientific and scientific-applied activity

The candidate Krasen Angelov, PhD has documented his participation in a total of 10 projects, of which 4 are national projects under Operational Programme “Science and Education for Smart Growth”, 2 are national projects under the national “Scientific research” fund of Ministry of Education and Science and 4 are university research projects at University Center for Research and Technology of TU-Gabrovo. The candidate is the head of one of the university projects.

Krasen Angelov, PhD has submitted a reference from the global database Publons of Clarivate Analytics for 8 verified reviews for the period from 2017 to 2018 in the international scientific journal “IET Electronics Letters” (with IF 1.231).

2.3. Implementation activity

No reference or official notes are submitted for the candidate's implementation activities. However, from the documentation submitted by him for participation in the competition, it can be concluded that he participated in the development of three demonstration scientific-educational models, implemented for teaching and research purposes on the territory of the Department of Communication Engineering and Technology at TU-Gabrovo: communication platform for intelligent parking management, passive optical network model and system with dynamic ambient light effects for multimedia displays and screens.

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

Analyzing the materials submitted for review, the contributions mentioned in them can be summarized as scientific-applied and applied.

In my opinion, the scientific-applied contributions include:

- Models of a wireless MIMO channel for indoor communication is synthesized and studied, taking into account the characteristics and spatial-temporal properties of the channel, the electromagnetic propagation of the signals and the parameters of the used antennas.

- There are created models for research, analysis and evaluation of the performance of high-speed (10 to 40 Gbps) single-channel optical networks using different formats for optical signal modulation (NRZ, RZ, CSRZ, DM, and MDRZ), different schemes for dispersion compensation (symmetrical compensation, pre- and post-compensation) and solving optimization tasks.

- There are developed and studied simulation models of multi-channel (4- and 8-channel) high-speed (10 to 40 Gbps) optical communication networks, which provide an opportunity to solve optimization tasks by criteria of achieving minimum BER value or maximum Q-factor and ensuring maximum network performance and efficiency at different signal input parameters.

- Methodologies based on the iterative approach for optimal planning and dimensioning of the length and number of amplifying sections in coaxial and optical transmission networks are developed.

- Models for modeling, research and implementation of predictive analysis of the reliability and fault tolerance of communication networks, systems and service devices are synthesized.

The applied contributions are:

- It is developed a LoRaWAN platform for providing access for creating and testing applications for intelligent communication in IoT (Internet of Things) with functionality for assessing the efficiency of technology and quality of the provided radio coverage in urban environments.

– There are developed demonstration models of a multi-channel LoRaWAN communication gateway and of a LoRa-based communication platform for application in intelligent control systems and for educational and research purposes, using software-defined radio systems.

– It is studied radio coverage of the LoRa/LoRaWAN network on the territory of the town of Gabrovo as part of a platform for communication and testing of applications based on the developed complete LoRaWAN architecture.

– It is developed a module for receiving and retransmitting digital satellite (DVB-S/S2) signals over an IP network and for real-time monitoring of the parameters of the retransmitted satellite signals.

– There are experimentally studied the parameters and characteristics of a satellite channel for transmission of digital television signals in standard DVB-S/S2. An experimental laboratory model with the necessary measuring instruments and software is synthesized.

– A model of passive optical network (PON) for delivery of interactive services is developed, providing: convenient and easy staff training; a wide variety of practical research (traffic processing, introduction of new services and modules for management and communication, etc.); a platform for conducting general research in the field of passive optical networks.

4. Assessment of the candidate's personal contribution

I can assess the individual contribution of Ch. Assist. Prof. Krasen Angelov, PhD in the presented research and results as significant for theory and practice. I mainly focus on the applied developments presented by the candidate of information-based modules and systems for communication on the Internet of things, created for educational, research and scientific purposes.

5. Critical remarks and recommendations

I have no serious remarks and recommendations to the submitted materials, but I can note the following:

- Copies of the cover, publisher, editorial and review staff and content are not provided for the textbooks.
- The formulated contributions are not summarized as scientific-applied and applied.
- There are no attached documents for implementation of the results in companies.

These critical remarks do not affect the good overall impression of the works submitted in the competition. I would recommend the candidate to spend more time on research and publishing their results in major international journals with Impact factor, as well as to more actively seek opportunities for practical implementation in business and monetization of the results of their developments.

6. Personal impressions

My personal impressions of the candidate in the competition are positive, both in terms of his teaching qualities and in his capacity as a researcher with proven potential to create and develop constructive ideas in education and technology.

7. Conclusion

In view of the above, I propose Chef Assist. Prof. Krasen Kirov Angelov, Ph.D. to be awarded the academic position of “Associate Professor” in the field of higher education – 5. Technical Sciences, professional field – 5.3. Communication and Computer Engineering, specialty – “Communication Networks and Systems” (“Wireless Communications and Broadcasting”, “Security equipment”).

21.10.2020 г.

Member of the scientific jury: /signature/
/Prof. Georgi Iliev, PhD/