

OPINION

**for the concourse for Associate Professor in Professional Direction
5.2 "Electrical engineering, electronics and automation - Application of the
principles and methods of cybernetics in various fields of science (biomedicine)",
announced in State Gazette, no. 69 from 16 August 2024
for the needs of Section "Processing and Analysis of Biomedical Signals
and Data" at the Institute of Biophysics and Biomedical Engineering – BAS,
with a single participant Senior Assistant Todor Venkov Stoyanov, Ph.D**

1. Senior Assistant Dr. Todor Stoyanov was born on June 6, 1972 in Sofia. He completed his bachelor's and master's degrees at the Technical University of Sofia in the period 1994 - 1999, after which he was a Specialist (1999), Assistant (2002 – 2005) and Senior Assistant (as of 2005) at the Central Laboratory of Biomedical Engineering - BAS (CLBME - BAS), which after 2010 became the Institute of Biophysics and Biomedical Engineering – BAS (IBPhBME - BAS). In 2004, he defended a thesis for the educational and scientific degree "Doctor" before the Specialized Scientific Council on automation and control systems at the Higher Attestation Commission.

2. According to the "Author's Reference", Dr. Stoyanov participates in the concourse with 36 scientific papers (at one place in the Reference it is incorrectly written that the number is 37), which are distributed as follows:

- 8 papers in journals with an impact factor,
- 13 papers with SJR, without impact factor,
- 15 papers in peer-reviewed journals without either SJR or impact factor,

which bring him a total of 374.5 points according to the Regulations of IBPhBME-BAS for occupying the academic position "Docent" under PN 5.2.

His Scopus h-index is 8 (with excluded self-citations of all authors).

3. I accept essentially his "*Main contributions related to the contest entries*", but I would define them as:

- **scientific contributions:**

1) Development of new methods for filtering ECG signals, detection of P-waves and cardiac arrhythmias, and analysis of ECG signals;

2) Research in the theory of intuitionistic fuzzy sets (IFS), related to:

a) introducing new orders of intuitionistic fuzzy pairs, and

b) studying the set of all IFSs defined over a fixed universe and having the same distribution of degrees of uncertainty of its elements, in order to find the necessary and sufficient conditions for converting the specific inclusion relation defined for these IPSs into a standard IPS-relation.

- **scientific and applied contributions:**

1) Program implementation of the methods specified in point 1 of the scientific contributions;

2) Detection through intercriteria analysis of proximity between the criteria for evaluating ECG signals, with the aim of reducing the number of these criteria and reducing the complexity of the calculations.

3) Development of generalized net models of the follow-up processes of patients suffering from diabetes and/or dementia, with the aim of simulating different situations related to these patients and the healthcare facilities that serve them.

In this connection, I can add that these studies were carried out in the frames of the project GA-2009-247541 "Models for ageing and technological solutions for improving and enhancing the quality of life (MATSIQEL)" under the Marie Curie International Research Staff Exchange Scheme, coordinated by me, in which Dr. Stoyanov was a participant, about which he did not provide data about it in his documents.

• **applied contributions:**

- 1) Development of prototypes of devices for registering, calibrating and testing ECG signals;
- 2) Development of a device for testing ECG devices.

4. The candidate has provided a list of papers containing 380 citations of his papers. However, from the check I made in Google Scholar (scholar.google.com), I found that only the last paper in his list has yet another citation that is not reflected in his documents.

5. From the annual reports of CLBME - BAS, which I was the Scientific Secretary of in the end of the last and the beginning of the present century, I found that Dr. Stoyanov supervised course projects of students from FETT TU - Sofia and was the scientific supervisor of 4 defended graduates.

The minimum quantitative indicators of the criteria for occupying the academic position "Associate Professor", required by the *Academic Staff Development Act in the Republic of Bulgaria*, the *Regulations for its implementation*, and the *Internal Regulations of the Institute of Biophysics and Biomedical Engineering - BAS*, are all satisfied. The citation of his scientific works speaks of the candidate's recognition in the scientific circles in Bulgaria and abroad.

All of the above justifies my positive assessment of the materials, with which the candidate participates in the concourse for "Associate Professor", and to recommend to the respected members of the Scientific Jury, appointed by Order No. 1349/14.10.2024 of the Director of IBFBMI- BAS, and subsequently to the respected members of the Scientific Council of the Institute, to vote positively for the awarding of Senior Assistant Todor Venkov Stoyanov, Ph.D., to the academic position "Associate Professor" in Professional Direction 5.2 "Electrical engineering, electronics and automation".

20 October 2024

Referee: 

(Acad. Prof. DSc DSc Krassimir Todorov/Atanassov,
IBPhBME-BAS)