SHORT REVIEW

on a competition for occupation of the academic position "Associate Professor"
in professional field 4.6. Informatics and Computer Science,
announced in State Gazette No. 68 of July 31, 2020
by the Institute of Information and Communication Technologies – BAS,
Department of Information Technologies for Sensor Data Processing

This short review is prepared by Prof. Dr. Maria Nisheva-Pavlova from Sofia University St. Kliment Ohridski as a member of the scientific jury for the competition according to Order No. 194 / 07.10.2020 of the Director of the Institute of Information and Communication Technologies (IICT) – BAS.

One applicant has submitted documents for participation in the announced competition: Dr. Dimiter Petkov Prodanov.

1. General description of the materials presented

The documents of the applicant comply with the requirements of the Act of the Development of the Academic Personnel of the Republic of Bulgaria (ADAPRB), the Rules for the Implementation of the Act of the Development of the Academic Personnel of the Republic of Bulgaria (RIADAPRB), the Rules for the conditions and the order for acquiring scientific degrees and for occupying academic positions in BAS and the Rules for the specific conditions for acquiring scientific degrees and for occupying academic positions in the Institute of Information and Communication Technologies.

The applicant has submitted for the competition:

- European CV,
- Copy of diploma for educational and scientific degree "Doctor",
- Certificates of internship in the speciality,
- List of scientific publications for participation in the competition,
- List of other scientific and applied results of the applicant,
- Lists of citations of publications of the applicant,
- Abstracts of the publications of Dr. Dimiter Prodanov presented at the competition (in Bulgarian and in English),
- Copies of the scientific publications for participation in the competition,
- Reference for the fulfillment of the minimum national requirements and the requirements of IICT – BAS for the professional field 4.6. Informatics and Computer Science,

- Reference for original scientific and applied scientific contributions,
- Declaration that there is no proven plagiarism in the scientific works of Dr. Dimiter Prodanov.

The documents of the applicant have been prepared in compliance with the requirements of the Rules for the specific conditions for acquiring scientific degrees and for occupying academic positions at IICT – BAS.

2. Details of the applicant

The applicant Dr. Dimiter Prodanov has a higher education in medicine, completed in 1989 at the Medical University – Sofia. In 2006 he received a doctoral degree. He has worked consecutively as a research associate and researcher at the University of Twente (Netherlands), the University of Leiden (Netherlands), the Catholic University of Leuven (Belgium), and the University of Liège (Belgium). He is currently a Senior Researcher at IMEC (Leuven, Belgium).

3. General characteristics of the applicant's scientific work and achievements

The research activities of Assoc. Dr. Dimiter Prodanov and the topics of his scientific works are in the field of competition. The publications with which he participates in the competition do not repeat those of the previous procedure for the acquisition of his doctoral degree.

Six of the scientific papers submitted for participation in the competition are single-authored and the remaining 22 are co-authored. I assume that the personal contribution of the applicant in the collective publications is equal to that of each of the other co-authors.

There is no proven plagiarism in the scientific works of Dr. Dimiter Prodanov.

In accordance with the requirements of the Rules for the specific conditions for acquiring scientific degrees and for occupying academic positions at IICT – BAS, the candidates for an academic position of associate professor in professional field 4.6. Informatics and Computer Science must have: 50 points in group of indicators "A", at least 100 points in group of indicators "B", at least 260 points in group of indicators "Г", at least 70 points in group of indicators "Д", at least 20 points in group of indicators "E".

Each of these conditions is stronger than the corresponding requirement under Art. 1a, para. 1 of the RIADAPRB.

According to the submitted documents the applicant covers:

- 50 points in group of indicators "A",
- 150 points in group of indicators "B",
- 327 points in group of indicators "Г",

- 897 points in group of indicators "Д",
- 50 points in group of indicators "Е".

Therefore, the minimum national requirements and the additional requirements under Art. 1a, para. 2 and para. 3 of the RIADAPRB for occupation of the academic position of "Associate Professor" in the professional field 4.6. Informatics and Computer Science have been completely covered and exceeded by Dr. Dimiter Prodanov.

4. Substantive analysis of the scientific and applied scientific achievements of the applicant, presented in the materials for participation in the competition

The scientific papers, presented by Dr. Dimiter Prodanov for participation in the competition, contain original research results, which can be grouped and summarized as follows:

- Group 1: *Neuroinformatics frameworks for signal processing and data analysis*. A classification of nerve fibers by proposing a criterion based on the variation of the sample acting on the distribution of their equivalent diameters is proposed. The same criterion was used to classify the marked axons using the size of the fluorescent marker. Topographic maps of nerve fibers have been constructed that innervate the gastrocnemius muscle for the classes of fibers derived from the L6 spinal root. A conceptual framework for understanding the comparative anatomy of peripheral nerves and spinal roots in different species has been developed based on fluorescence microscopy. An original algorithm for decomposing digital signals has been proposed.
- Group 2: *Computer algebra tools for computational biology*. Cell migration and diffusion of soluble substances around the implant are modeled. The asymptotic behavior of the proposed model is studied. Analytical solutions are obtained for some of the considered cases.
- Group 3: *Neuroprostheses and plasticity of the Central Nervous System*. It has been shown that it is possible to characterize the rhythm of activity of neurons with respect to their burst index. Asymmetry of activity between the left and right hemispheres of the brain has been demonstrated. The role of proteins on the redox processes of the electrode surface during the electrostimulation cycle has been established. An original method for measuring electrochemical parameters is proposed. The effect of dexamethasone in a model of neuronal trauma of new-borns in vivo has been demonstrated. A special cuff electrode has been created, allowing marking of the perineurium of the sciatic nerve together with electrical stimulation of the nerve. The electrode was validated in terminal experiments on adult rats.

The significance of the applicant's research results is largely evidenced by their reflection in the works of other authors. Dr. Dimiter Prodanov submitted data for a total of 151 citations of

publications with which he participates in the competition, in articles of other authors that were referenced and indexed in Scopus.

5. Critical notes and recommendations

Some of the documents of Dr. Dimiter Prodanov for participation in the competition are prepared insufficiently precisely and are structured in an inappropriate way. Bibliographic descriptions of the publications by other authors citing works of the applicant, are not included in his documents.

I recommend Dr. Prodanov to focus also on working with students and especially on supervision of graduates in order to be able to contribute to the preparation of the nest generation of researchers in the complex interdisciplinary field in which he works.

6. Personal impressions of the applicant

I have no immediate personal impression from the applicant.

7. Conclusion on the application

Having become acquainted with the materials and scientific works presented in the competition and on the basis of the analysis of their importance and the scientific and applied contributions contained therein, I **confirm** that the scientific achievements of the candidate Dr. Dimiter Prodanov meet the requirements of the ADAPRB, the Regulations for its implementation and the corresponding BAS Regulations and IICT Rules for the occupation of the academic position of "Associate Professor" in the professional field "Informatics and Computer Science". In particular, the applicant meets the minimum national requirements in the professional field and no plagiarism has been detected in his scientific papers submitted at the competition.

I give a **positive assessment** of the application of Dr. Dimiter Prodanov.

GENERAL CONCLUSION

Based on the above, **I recommend the scientific jury to vote on a proposal to the Scientific Council of the Institute of Information and Communication Technologies of the Bulgarian Academy of Sciences to select Dr. Dimiter Petkov Prodanov for the academic position of "Associate Professor" in the professional field 4.6. Informatics and Computer Science.**

December 2, 2020

Reviewer: .....

(Prof. Dr. Maria Nisheva-Pavlova)