

## REVIEW

on a competition announced by the Medical University „Prof. Dr Paraskev Stoyanov” - Bapna, for acquiring the academic position of "Professor" in the field of higher education – 5. Technical Sciences, professional direction – 5.6. Materials Science, Scientific specialty – „Materials Science and Materials Technology”, promulgated in SG, no. 53 from 12.06.2020, with candidate Assoc. Prof. Tsanka Dimitrova Dikova, DSc

**Reviewer: Professor Jordan Maximov, DSc**

Only one candidate participates in the competition – Assoc. Prof. Tsanka Dimitrova Dikova, DSc, born on September 2, 1961. The candidate works at the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna, Department of „Dental materials science and propaedeutics of prosthetic dentistry”, and occupies the academic position „Associate Professor”.

### **1. Evaluation of the research, scientific-applied and publishing activity of the candidate after the last three procedures (PhD, Associate Professor, DSc)**

According to this indicator, the candidate Assoc. Prof. Tsanka Dikova participates in the competition with an asset, which I have classified as follows, regardless of the candidate's view, expressed in the respective lists:

*a. PhD dissertation*

**1 number;**

*b. DSc dissertation*

**1 number;**

*c. Scientific articles in international scientific journals with impact factor*

**6 numbers**, marked as <sup>1</sup>Г-7-3, Г-7-8, А-7, А-8, А-16, А-17;

*d. Scientific articles in international scientific journals without impact factor*

**13 numbers**, marked as Г-7-2, Г-7-5, Г-7-6, А-1, А-2, А-4, А-5, А-6, А-9, А-10<sup>2</sup>, А-11, А-13, А-14;

*e. Scientific articles in journals in Bulgaria*

**27 numbers**, marked as Г-7-1, Г-7-7, Г-7-9, Г-8-2, Г-8-3, Г-8-4, Г-8-5, Г-8-6, Г-8-7, Г-8-9, Г-8-10, Г-8-11, Г-8-12, Б-2, Б-5, Б-7, Б-8, Б-9, Б-12, Б-13, Б-14, Б-15, Б-16, Б-17, Б-19, Б-20, Б-21;

*f. Book chapter*

**1 number**, marked as Г-7-4;

*g. Monographs*

**2 numbers;**

*h. Scientific conferences abroad – printed reports in the Proceedings of the relevant forum*

**5 numbers**, marked as А-3, А-12, А-15, А-18, А-19

*i. Scientific conferences in Bulgaria – printed reports in the Proceedings of the relevant forum*

**9 numbers**, marked as Г-8-1, Г-8-8, Б-1, Б-3, Б-4, Б-6, Б-10, Б-11, Б-18.

<sup>1</sup> According to the list of publications provided by the candidate

<sup>2</sup> In a Ukrainian journal, about which I found no information.

According to this indicator (research, applied research and publication activity) the candidate participates in the competition with a total of 65 works. I do not accept the first two (abstracts of the two dissertations) for review, because they have been reviewed in previous procedures.

As I have pointed out many times, there is a correlation between the quality of the published research results on the one hand, and the place and form of publication on the other. The publications in the international scientific journals with high impact factor, published for example by Elsevier, Springer, ASME, Wiley, SAGE have a high certificate of quality and significance due to the guaranteed high level of the review process by scientists from all over the world; scientists of reputation in their field. That is why I have paid more attention to this section of the review in order to assess as objectively as possible (as far as possible by the subject) the position of the candidate in his scientific field.

The six articles with an impact factor (according to the references given by the candidate) have been published in the following journals:

- 1) Russian Metallurgy<sup>3</sup> – edition of Springer; according to Web of Science the last impact factor is for 1999 – IF=0.007;
- 2) Processes – edition of MDPI Publication, Basel, Switzerland; according to Web of Science the impact factor for 2019 is IF=2.753;
- 3) Metal Science and Heat Treatment – edition of Springer; according to Web of Science the impact factor for 2019 is IF=0.420;
- 4) Металлы (in Russian) – edition of ООО НПП „ЭЛИЗ”, Moscow; not recognized by Web of Science;
- 5) Металловедение и термическая обработка металлов Митом (in Russian) – edition of Folium, Moscow, Russia; not recognized by Web of Science.

Therefore, the candidate has 4 articles with an impact factor in the competition field, as the last two journals (Металлы and Металловедение и термическая обработка металлов) are not recognized by either the Web of Science or Scopus.

The twelve articles without impact factor have been published in the following international scientific journals, which, however, have Scientific Journal Ranking (SJR):

- a) Archives of Materials Science and Engineering, issued by Association for Computational Materials Science and Surface Engineering in collaboration with the Committee for Material Sciences of the Polish Academy of Sciences, indexed by Scopus: SJR=0.22 – 3 articles (Г-7-2, Г-7-5, Г-7-6);
- б) Advanced Materials Research, edition of Scientific Net: SJR=0.155 – 6 articles (A-1, A-2, A-5, A-6, A-9, A-11);
- в) Advances in Materials and Processing Technologies, edition of Taylor&Francis: SJR=0.235 – 2 articles (A-13, A-14);
- г) AIP Conference Proceedings, edition of AIP Publishing Center – 1 article (A-4).

One of the journal in Bulgaria has SJR, namely Journal of IMAB (International Medical Association Bulgaria); the publisher is Peychinski, Plevan, Bulgaria, SJR=0.103.

The book chapter (Г-7-4) is printed in Lecture Notes in Networks and Systems, Springer edition with SJR = 0.125.

The candidate submits two monographs. The first of them (indicator "B" from Academic Staff Development Act), „Cobalt-chrome dental alloys produced by selective laser melting”, I appreciate very highly. The second work (for which the candidate claims a monograph) „Design of sheet metal stamping equipment”, in my opinion it is not a monograph, because it does not correspond to the first sign of a monograph - originality and novelty of the obtained results. However, the author himself has

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<sup>3</sup> Two articles by the candidate have been published in Russian Metallurgy – Г-7-3 и A-17

wrote in the introduction „... a practical guide for development and construction of sheet metal stamping tools ...”, and further „... basic guide for designing equipment for cold sheet stamping.” I also perceive the book in this way. I think that this is a very useful guide for engineers in practice, as it synthesizes the rich engineering experience of Assoc. Prof. Tsanka Dikova.

The candidate has attached a reference for participation in 56 scientific conferences (23 abroad and 33 in Bulgaria). In a personal conversation with the candidate, I have expressed my opinion on this issue.

In more than half of the collective scientific articles and reports the candidate is the first author. In a significant part of the other articles and reports that are co-authored with her former supervisor or her PhD students, the candidate is a second author (for understandable reasons). It is not difficult to guess that the candidate is the main engine of research, the results of which are published collectively. And the candidate's excellent command of English and Russian suggests that it was she who wrote the publications.

The works in competition (mainly articles in international scientific journals) are cited 30 times by foreign authors, four of the citations are by the famous pole Dobrzanski. These facts speak of the importance of the results achieved by the candidate.

The candidate is deputy Editor - in - Chief of two international scientific journals indexed by Scopus - Archives of Materials Science and Engineering and Journal of Achievements in Materials and Manufacturing Engineering, as well as the journal Scripta Scientifica Medicinæ Dentalis, published by the Medical University of Varna. She is a scientific secretary (this position, referred to a scientific journal, is incomprehensible to me) of the journal “Materials Science. Non-Equilibrium Phase Transformations”. The above facts point to the reputation of the candidate in the relevant scientific community.

The activity of the candidate as a reviewer is impressive, at least for me. She is a reviewer in 5 international scientific journals with impact factor (according to a report by the Web of Science) and in 6 other international scientific journals. I especially appreciate the fact that one of these journals is the Journal of Materials Engineering and Performance, published by Springer. The candidate is also a reviewer in Bulgarian journals.

The candidate has participated in writing and implementing six research projects: one national to the "National Research Fund", two university (Medical University - Varna) and three, with which she won a Fulbright Fellowship and two Fellowships at Tokai University, Japan. The latter is in direct correlation with the candidate's qualifications.

The applicant has worked in the company Mauer Locking Systems during the period 01.01.2007 - 01.09.2007. The reference showing implemented by the candidate projects is impressive and reflects the considerable experience of the candidate.

The candidate's research, and as a consequence the publications, can be summarized in the following areas, arranged in descending order, according to the “relative share of the publications” criterion:

- 1) Application of the technologies for 3D printing in the dental medicine
- 2) Surface treatments via concentrated energy flows
- 3) Nano-materials and nano-coatings in mechanical engineering, general and dental medicine
- 4) Technologies and materials for correction of teeth and dentitions
- 5) Investigation of corrosion processes in steels and alloys
- 6) Modern software in mechanical engineering and dental medicine

*In conclusion, it can be said that the main method applied to the object of study and used by the candidate is the experimental (natural experiment). Given his leading role in the research process, the candidate acts as a generator of ideas and analyzer of the obtained empirical results.*

## **2. Assessment of the educational activity and qualification of the candidate**

Assoc. Prof. Tsanka Dikova participates in the competition with a total of 4 textbooks - 2 in Bulgarian and 2 in English. The candidate works as an Associate Professor at the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna since 2007 until now.

The subjects taught in Bulgarian are: Dental Materials Science; Dental materials science, apparatus and instruments; Nano-materials and nanotechnologies in medicine. In English: Dental Materials Science; Nano-materials and Nanotechnologies in Medicine.

In 2005 and 2006 the candidate has lectured and led exercises in 2 subjects at the Technical University of Varna: Special technologies in metal casting; Structural and technological documentation, measuring instruments and measurements.

The candidate has read 8 lectures at foreign universities: Tokai, Japan - 2005, 2017, 2018; Rice and Davenport Universities, USA - 2011, 2012; Xidian University, China - 2015.

The candidate has supervised 10 graduate students - nine from Bulgaria and one from Japan. Under the supervision of Assoc. Prof. Tsanka Dikova, 4 doctoral students have successfully defended their dissertations.

The candidate has won a Matsumae Scholarship and has worked at Tokai University, Japan for almost a year. She has won a Fulbright Fellowship and worked at Rice University in Houston, USA, for 5 months. She has completed a one-month specialization at the St. Petersburg Maritime Technical University.

As I noted above, the candidate is fluent in Russian and English.

In 2012, Assoc. Prof. Tsanka Dikova has awarded a gold badge "Prof. Asen Zlatarov" of the Federation of Scientific and Technical Unions in Bulgaria for creative contribution and high results in science and technology. In 2013 she was elected a national expert in materials science and heat treatment of metals to the scientific and technical unions in mechanical engineering. In 2015, she has elected a member of the World Academy of Materials Science and Mechanical Engineering.

*Based on the above facts, I strongly believe that the candidate Assoc. Prof. Tsanka Dikova has the necessary qualifications to hold the academic position of "Professor" at the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna.*

## **3. Main scientific, scientific-applied and applied contributions**

In the reference provided by the applicant, the contributions are given for each scientific field (see section 1 of the review), and are classified into scientific, scientific-applied and applied. Additionally, a seventh direction is included, containing introduced in the practice results from completed engineering projects. Four applied contributions are included in this area. As the candidate has discussed all the contributions with me in advance, I accept them as given in the report.

In my opinion, the scientific contribution on the origin, mechanisms of formation and growth of titanium tubes on the surface of titanium and titanium alloy Ti-6Al-4V, which is also used in the aerospace industry, is especially valuable..

## **4. Meeting the minimum requirements for holding the academic position of "professor", defined in the Law for development of the academic staff in the Republic of Bulgaria from 2018**

The applicant has submitted a reference, which shows that its activity meets the minimum requirements.

## 5. Significance of the contributions to science and practice

The large number of citations by authors from abroad of the publications of Assoc. Prof. Tsanka Dikova shows the importance of her results, respectively the importance of the contributions contained in her scientific works for science and practice.

## 6. Notes and recommendations

- I strongly believe that the B-10 and B-11 reports, concerning elementary aspects of the engineering graphics, are not in the field of the competition. I recommend the candidate not to engage in such unprincipled collaborations in the future.
- In the finite element simulations I have found weaknesses, which I have discussed with the candidate and I have made appropriate suggestions for corrections.
- Works A-8 and A-7 present the same subject matter, one of which is a translation into English from the other, written in Russian.
- I recommend Assoc. Prof. Tsanka Dikova to publish in the future the results of her research in prestigious journals with an impact factor in material sciences editions of Elsevier and Springer, as she had done with two of the articles in her DSc dissertation, published respectively in Engineering Failure Analysis and Engineering Fracture Mechanics (editions of Elsevier).

## 7. Personal impressions

I was a reviewer of DSc dissertation of Assoc. Prof. Tsanka Dikova. I was left with excellent impressions. I believe that Assoc. Prof. Dikova is a scientist with established positions in the international scientific circles in material sciences. She has worked in numerous research centers (for example in Japan, USA) and has established relevant personal contacts. The reference in google scholar citation shows that it has h-index = 9 and a total of 267 citations. She is a reviewer in international scientific journals with impact factor indexed by Web of Science (for instance, Journal of Materials Engineering and Performance), which I appreciate very much.

## 8. Conclusion

Based on my acquaintance with the scientific works and activities of the candidate Assoc. Prof. Eng. Tsanka Dimitrova Dikova, DSc, as well as on the basis of my personal impressions, I find it reasonable to propose:

**Assoc. Prof. Tsanka Dimitrova Dikova, DSc, to take the academic position of "Professor" at the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna, in the field of higher education 5. Technical sciences, professional field - 5.6. Materials and materials science, scientific specialty - "Materials science and technology of machine-building materials"**

September, 2020 г.  
Gabrovo

Reviewer:

  
(Prof. Jordan Maximov, DSc, PhD)