OPINION

by Prof. Valentin Slavov Obretenov, Technical University - Sofia

Regarding competition for the academic position “Associate Professor” in the area of higher education – 5. Technical Sciences, professional field 5.1. Mechanical Engineering, specialty “Industrial Heat Engineering”

In the competition for the academic position “Associate Professor” announced in the State Gazette, No. 58/23.07.2019 and on the website of the Technical University - Gabrovo for the needs of the Department of Power Engineering at the Faculty of Mechanical and Precision Engineering, the only applicant is the Chief Assistant lecturer Eng. Valentin Metodiev Petkov, PhD.

1. Overview of the content and the results from the presented works

The works presented by Chief Assistant lecturer Valentin Petkov, PhD for the purpose of the competition have been systematized in the following manner:

- Synopsis of a thesis for doctoral degree;
- Articles in Journals with IF - 3;
- Articles published abroad - 11;
- Articles published in Journals in Bulgaria - 8;
- Reports from scientific conferences in Bulgaria - 3;
- Monograph;
- Learning aids - 3.

Out of all published works (other than the thesis and the monograph), 5 represent individual works and the others are co-works, where the applicant is designated in first place in 8 works.

The main part of the research works presented for the competition refer to studying the major aspects of heat exchange in piping systems with various geometry for the purpose of process intensification.

All presented works refer to the area of the competition. A major part of them have been published in reputable journals and forums abroad, which determines the comparatively big number of quotes (total of 28, including 10 in journals with IF and other 15 - in foreign journals). This is indicative of the significance of the researches made and the results achieved and also about their publicity in the scientific areas.

2. General description of the applicant’s activity

Chief Assistant V. Petkov, PhD has completed his secondary education in 1980 at the Vocational School of Mechanical and Electrical Engineering Gen. Vl. Zaimov, town of Sopot and in 1987 graduated from the Technical University - Gabrovo, majoring Technology of Machine Manufacturing and Metal Cutting Machines with qualification Mechanical Engineer.

From the materials presented for the competition it is evident that in 1987 he was appointed as an Assistant lecturer at the Technical University - Gabrovo and was successively appointed as Senior Assistant lecturer (1990) and Chief Assistant lecturer (2003) and in 2003 he successfully defended a doctoral degree. Most of the professional career of Chief Assistant lecturer V. Petkov, PhD has been at the Technical University - Gabrovo and he worked as a production manager in Jersey Decoration Co. (Doha, Qatar) only in the period 1997 - 1999.

3. Educational and teaching activities

Chief Assistant V. Petkov, PhD is a lecturer with significant teaching experience. He teaches 8 courses (comparatively high number for a lecturer without academic rank). Three of them are in the Bachelor degree programmes ("Thermal dynamics" - general course; "Thermal Dynamics II", "Basics of Ventilation and Air conditioning Equipment") and five courses in the Master degree programmes ("Architectural-construction and Heat Engineering Characteristics of Buildings", "Heat and Mass Exchange Equipment", "Secondary Energy Resources", "Heat Exchange Intensification" and "Thermodynamic bases of Ventilation and Air-conditioning").

The applicant is an author of two learning aids (5.2. and 5.3) and co-author of another one (5.1).

It is worth to note also his work focused on the development of the laboratory facilities for the courses that he teaches: He has taken part in the development of a research laboratory "Heat Exchange Intensification", which has a stand with modern research apparatuses.

From the submitted information it is evident that in the recent 5 years, Chief Assistant lecturer V. Petkov, PhD has been a supervisor of a very big number of graduates (80), which is a remarkable achievement in the educational work.

4. Research and scientific applied activity

The submitted list of projects with the applicant's participation is a testimony of active research and scientific applied work. In the period 2004 - 2019 he took part in the completion of 9 research contracts amounting to BGN 49,260 and for three of these contracts he headed the research team. All contracts are related to the scientific field in which the applicant works, i.e. in the area of the competition. It is worth to note the inclusion of many students and PhD students in the work teams (especially for the contracts where he is the leader).

The research works prove that the applicant is an experienced scientific worker who has a modern research tooling for practical solution of any issues in his scientific area.

5. Implementation activity

In the papers for the competition I didn't find proofs of implemented developments (other than the stand in the laboratory "Heat Exchange Intensification") in which the applicant participated. A reference from ZIP Engineering EOOD (N. Zagora) was submitted additionally proving that the developments of the research team to which Chief Assistant lecturer V. Petkov, PhD is a member, have been implemented in several (7) sites of the company.

6. Contributions. Importance of contributions for the science and the practice

The main contributions from the research works of the applicant have scientific-applied and applied nature and refer to the following areas:

A. Proving by new methods of essential new directions of already existing scientific areas, problems, theories, hypotheses:

- Formulating extended criteria for assessment of energy characteristics of single-phase laminar flows in channels with different geometry (2.1.2, 2.24, 2.25, 2.2.7, 4) and a criterion for preliminary assessment of the advantages upon applying methods for intensification of heat exchange in pipes and canals (3.2.2);
- Determination of thermodynamic characteristics of flows (2.1.1, 2.2.8, 2.29, 3.1.6, 3.1.7, 3.2.1);
- Determination of resistance ratios and heat transfer ratios in pipes with different modes of operation (2.1.1, 2.2.8, 2.2.9, 3.1.7, 3.2.1).

B. Creation of new classifications, methods, structures, technologies:

- Method to minimize the generated entropy for optimization of flows in channels (4);

- Methods for determination of energy characteristics of channels with tree structure (2.2.10, 2.2.11);
- Methods for determination of the pressure drop in spiral pipes (2.2.1);
- Test system for studying the heat exchange intensification in pipes and channels (3.2.1).

C. Obtaining and proving new scientific facts:

- Conditions are defined for generating minimum entropy by pipes with round cross section (4);
- It has been proven in which cases pipes in a bundle with different geometry they may be competitive to standard pipes with round section (2.1.2, 2.2.7, 4).

The number of quotes of the applicant's works in leading journals is a proof of the significance of the research and the achieved results.

7. Assessment of the applicant's personal contribution

The papers for the competition do not contain references and statements about the participation of the co-authors in collective publications (or a separating protocol), which does not allow correct assessment of the personal contribution of the applicant in these publications.

8. Critical remarks and recommendations

I have no remarks in principle to the materials presented for the competition. The reviewer's name is not mentioned in the monograph (4) but additionally such review of Prof. Y. Hristov, DSc was presented.

I would recommend to the applicant to be more proactive in the implementation of the results from his research (a major part of them with practical relevance) to the real economy.

9. Personal impressions

I have no direct impressions concerning the educational and research work of the applicant. From the discussions related to the competition, I have the impression that he is an erudite lecturer with notable delay in his academic development. This delay does not correspond to the data concerning the performance of the scientometric indicators and is evidence of the weaknesses of the regulatory system.

The reference for the fulfilment of the minimum requirements of the Technical University - Gabrovo and of the national requirements for the competition shows that they are completely satisfied by the applicant.

10. Conclusion

The above statements give me a ground to make the reasonable conclusion that the applicant fulfils the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria and its Implementing Regulations and therefore I confidently propose to appoint Chief Assistant lecturer Eng. Valentin Metodiev Petkov, PhD on the academic position "Associate Professor" in the area of higher education – 5. Technical Sciences, professional field 5.1. Mechanical Engineering, specialty "Industrial Heat Engineering".

Sofia, 31.10.2019

Jury Member: /signature/
(Prof. V. Obretenov)