

OPINION

on competition for academic position “Associate Professor” in specialty
Informatics, professional direction 4.6. **Informatics and Computer Science**,
announced in State Gazette No.41 of 21 May 2019

with a candidate

Assistant Prof. PhD Mag. Engineer Boryana Emilova Vachova
Department "Hierarchical Systems", ICT-BAS

by Assoc. Prof. PhD Vassil Guliashki - member of the Scientific Jury (Order No.
180 / 19.07.2019 of the Director of ICT-BAS)

The candidate in the competition Assistant Professor PhD Boryana Emilova Vachova is currently working in department "Hierarchical Systems", Institute of Information and Communication Technologies - BAS, Sofia. From July 2010 she was appointed as Assistant Professor at ICT - BAS, Sofia. From July 1993 to the end of January 1994 she worked as a software engineer at NOAC GmbH, Sofia, Bulgaria on the development of banking software. From the beginning of 1995 until the end of 2006 she worked at the Institute of Computer and Communication Systems - BAS as a Research Associate of the 3rd degree. From the beginning of 2007 to the end of June 2010 she worked at the Institute of Computer and Communication Systems - BAS as a Research Associate of the second degree.

The dissertation (PhD thesis) for awarding the PhD degree to the colleague Boryana Emilova Vachova is in the doctoral program “Application of the principles and methods of cybernetics in different fields of science (technical)”, professional direction 5.2 Application of the principles and methods of cybernetics in different fields of science (technical). The dissertation was defended at the Institute of Management and Systems Research - BAS (now the Institute of Robotics) in 2009.

1. General characteristics of the scientific and scientific-applied activities of the candidate

The overall activity of Assistant Prof. Boryana Emilova Vachova can be evaluated as very good and covers the following areas: fuzzy networks, research and modeling of complex nonlinear

systems and processes, methods for knowledge extraction about complex processes under conditions of uncertainty, multi-valued logic, etc. These directions coincide with the professional direction of the announced competition. This activity has been proven by a large number of publications, one monograph and participation in projects, especially after receiving her PhD degree.

2. Basic scientific and scientific-applied contributions

The contributions by the candidate are scientific and scientific-applied.

The scientific contributions are as follows:

- 1) A model has been developed with a network structure for extracting knowledge about complex processes
- 2) A method for modeling multifactor nonlinear stochastic objects is developed
- 3) A method has been developed using genetic algorithms and a gradient-based method for faster convergence to local extrema.

The scientific-applied contributions are as follows:

- 1) A method for extracting knowledge about non-stationary processes has been developed by combining data into packages using multi-valued logical and probabilistic functions
- 2) A logical method for knowledge extraction based on experimental data on technological process for copper ore flotation has been developed.
- 3) The innovative theory of fuzzy networks has been applied to different types of complex processes and objects

Scientific and scientific-applied contributions are based on 17 publications at prestigious scientific conferences and in scientific journals, one of which is a monograph with 128 pages.

3. The importance of the contributions to science and practice

The candidate's contributions from the research work are significant and are in the field of fuzzy networks theory, knowledge extraction, modeling of complex processes and systems. The candidate is known through his publications in Bulgaria and abroad. There are over 15 citations of works, most of which are in publications abroad. The candidate has been the coordinator of three international projects under the European Erasmus + programme and has been involved in many other research projects.

4. Critical notes and recommendations for future work

In my opinion the candidate has scientific potential and that is why I will make some recommendations for future work. She should focus her efforts on producing more publications with impact factor, as well as publications with open access. This would increase the number of citations of her publications.

CONCLUSION

The documents for the competition are very well arranged and well-formed. They are accompanied by proofs. Colleague Assistant Prof. Boryana Vachova has reached and exceeded the minimum requirements of the Regulations for the Development of the Academic Staff of IICT-BAS for the occupation of the Academic position "Associate Professor". There are points for all groups of indicators in the Minimum Requirements evidence, the total number of points is 568. The work done is entirely done by the candidate. I do not personally know the candidate, but on the basis of my detailed knowledge of the competition materials, I conclude that they fully comply with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Rules for the implementation of the Law on the Development of Academic Staff, as well as the Rules for the development of academic staff of IICT - BAS. My overall assessment of the applicant's scientific work is very high. The candidate has significant scientific and scientific-applied contributions to the fields of fuzzy networks theory, knowledge extraction, modeling of complex processes and systems. They are based on 17 publications, of which 1 is a monograph. The candidate is the manager of 3 international projects. That is why I completely convinced propose the Assistant Prof. Boryana Emilova Vachova to take the academic position of Associate Professor in the professional direction 4.6. "Computer Science and Computer Science" in IICT-BAS, section "Hierarchical Systems".

13.09.2019 г.

Member of the Jury:

**NOT FOR
PUBLIC RELEASE**

/Assoc. Prof. PhD Vassil Guliashki/