

Review

Call for Associate Professor position in 4.6 Informatics and Computer Science (Computer Programming and algorithms) of the Faculty of Mathematics and Informatics (FMI) at Sofia University as published in the State Gazette No 65 of the 16th August 2019

Reviewer: Assoc. Prof. Dr. Svetla Boytcheva, Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, a member of the scientific jury for the competition according to Order No. ПД 38-608 / 11.10.2019 of the Rector of SU.

The only candidate for the call is **Chief Assistant Prof. Dr. Nora Angelova Angelova from FMI at Sofia University.**

I. General description of the submitted documents

1. Information about the submitted documents

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) and the Rules on the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at SU (RTCAADOAPSU).

The applicant Dr. Nora Angelova has submitted for the competition the following documents:

- CV;
- Copy of diploma for higher education MSc degree;
- Copy of diploma for higher education BSc degree;
- Copy of diploma for Ph.D. degree;
- Certificate of working experience in the specialty;
- List of publications (list of all publication – 33 in total, and list of 23 selected publications included in the documents for the competition);
- List of publications, presentations, projects and supervision activities, generated by the information system “Authors” of SU;
- Reference for the fulfillment of the minimum national requirements and the requirements of SU for the professional field 4.6 Informatics and Computer Science

- Lists of citations of publications of the applicant in articles - 16 citations of 9 publications.
- Reference for original scientific contributions,
- Documents proving the fulfillment of the requirements of Art. 122, para. 2 of RTCAA-DOAPSU,
- Copies of publications presented at the competition – 23 in total, including letters for acceptance for 3 of them; Abstracts of the publications presented at the competition (in Bulgarian and in English), Screenshots from Scopus, Web of Science, Zentralblatt MATH, SJR for proof about publications indexing.

The documents of the applicant Dr. Nora Angelova have been prepared carefully and in full compliance with the requirements of RTCAADOAPSU.

2. Information about the applicant

The candidate Dr. Nora Angelova graduated in 2012 Bachelor's Degree in Computer Science, and in 2013, Master's Degree, e-Business, and e-Governance at FMI, Sofia University "St. Kliment Ohridski ". In 2014-2017 she was a Ph.D. student and in 2017 she successfully defended the Ph.D. in Informatics at the Institute of Biophysics and Biomedical Engineering of the Bulgarian Academy of Sciences. In the period 2010-2015 she worked as a part-time lecturer at FMI, Sofia University "St. Kliment Ohridski ". From 2017 he started working as a Chief Assistant at the Department of Computer Informatics, FMI, Sofia University "St. Kliment Ohridski", where he has been working continuously. In addition, he has been working as a Senior Software Engineer at Astea Solutions since 2012.

3. General characteristics of the scientific achievements of the candidate

Dr. Nora Angelova's research activities and the topics of her scientific works are entirely in the field of competition. She has participated in the competition with 23 publications, which do not repeat those of the previous procedures for the acquisition of the Ph.D. degree. One of the publications is self-authored and the other 22 are co-authored. I have no doubt about the candidate's significant personal contribution to the collective publications. All publications are in English. The publications presented are in specialized scientific journals, proceedings of conferences and scientific series. Five publications are indexed in Scopus, 3 of which are in print. A total of 10 publications are indexed in Zentralblatt MATH. The candidate Dr. Nora Angelova has an h-index 2 in Scopus. A list of 16 citations of 9 publications has been presented, which is a very good indicator given that all of her publications are from

the last 5 years, which is a relatively short period of time. There is no proven plagiarism in the scientific works of Dr. Nora Angelova. She is a principal investigator of two research projects funded by the NSF.

In accordance with the requirements under Art. 1a, para. 1 of the RIADAPRB, the candidates for the academic position of assoc. professor in professional field 4.6 Informatics and Computer Science must have: 50 points in the group of indicators “A”, at least 100 points in the group of indicators “B”, at least 200 points in the group of indicators “Г”, at least 50 points in group of indicators “Д”.

RTCAADOAPSU does not define higher additional requirements than those specified in the RIADAPRB and does not change the scale by which points are calculated in the different groups of indicators.

According to the submitted documents for the competition, the applicant covers:

- 50 points per group of indicators “A”;
- 138 points per group of indicators “B”;
- 228 points per group of indicators “Г”;
- 52 points per group of indicators “Д”

Therefore, the minimum national requirements and additional requirements under Art. 2b, para. 2 and 3 of RIADAPRB for the occupation of the academic position of Assoc. Professor in the professional field 4.6. Informatics and Computer Science are completely covered by Dr. Nora Angelova.

4. General characteristics of the applicant's teaching activities

The candidate, Dr. Nora Angelova, has taught lectures and seminars on the fundamental required programming courses: "Introduction to Computer Programming", "Data Structures and Programming", "Object-Oriented Programming" for the specialties "Computer Science", "Computer Science" and " Information Systems” at FMI, Sofia University. She also taught elective lab exercises in the same disciplines. She also teaches an elective course in Communication and Presentation Skills, offered for all students at the faculty. In addition, she is actively using the Moodle course system, which makes it possible to provide study materials and other electronic resources to support student learning. She was the scientific adviser of two graduate MSc theses. Since 2018 she is a faculty advisor for students from specialty Informatics. She works actively also in the direction of attracting students for teaching assistants to support the Computer Science courses.

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

The presented original scientific results of the candidate Dr. Nora Angelova can be grouped in the following main areas:

- **Group 1: *Intuitionistic fuzzy logic*.** Dr. Nora Angelova's main scientific contributions are in this field, where she has submitted 15 publications for the competition [1, 2, 9-13, 15-18, 20-23]. These publications are related to each other and are the result of work on two scientific projects. They provide an in-depth comprehensive study in this field. All of the research results presented in these publications were applied to the development of the software for the automatic verification of the properties of IFSTool's intuitive fuzzy implications and negations.
- **Group 2: *Intercriteria Analysis*.** The results of research in this area are described in 4 publications [7, 8, 14, 19]. Numerous aspects have been considered for the application of Intercriteria analysis in various fields. A modification of the Intercriteria analysis has been proposed to allow it to be applied to intuitionistic fuzzy data. The application of Intercriteria analysis in the process of wastewater treatment is considered in order to carry out an in-depth analysis and to find connections between predefined 16 criteria for water treatment. A modification of an algorithm for Intercriteria analysis is proposed by using intuitionistic fuzzy implications instead of relations. Some of the properties of intuitionist fuzzy implications have been investigated.
- **Group 3: *Generalized nets*.** The original scientific results in this area are presented in 3 publications, addressing various aspects and applications of generalized nets. A new approach is proposed for software protection based on generalized nets [4] against brute-force attacks, as well as protection against reverse code engineering. In [6] is presented research for other applications of generalized nets to provide protection of processes that flow in uncertainty. Two new extensions of the concepts of Intuitionistic Fuzzy Generalized Nets of Type 1 and of Type 3, namely Interval-Valued Intuitionistic Fuzzy Generalized Nets of First Type and Third Type are introduced. In [5], a modification of Floyd's inductive assertion method for verification of flowcharts, which allows Generalized Nets without temporal component to be verified. New definitions of partial correct-

ness, completion of execution, and total correctness of generalized nets are proposed, following the definitions of the Floyd flowchart verification method. The main steps in the proof for partial correctness and to complete the implementation of the generalized net are presented. Two theorems in the field of generalized nets are defined.

- Group 4: *Game Models*. A generalized model for the n-dimensional case of the game “Life” is proposed. The formal description of the method is published in [3].

6. Critical notes and recommendations

I have no significant critical comments on the materials in the competition and in particular on the scientific works of Dr. Nora Angelova. I would recommend her to publish more independent scientific papers as well as university textbooks that would be very useful for the students. In addition, her involvement in teaching graduate courses would have an impact both for students' knowledge development, as well as to her scientific and professional experience.

7. Personal impressions from the candidate

I have known Dr. Nora Angelova since 2017 when she participated in the competition for the Assistant Professor in the Department of Computer Informatics, FMI, Sofia University, of which I was a member of the scientific jury. Even then, I was impressed by her precision and depth in the presentation of the material. These qualities allow her to realize herself as a good teacher who is loved and respected by both her students and her colleagues.

8. Conclusion on the application

After considering all the materials presented for the competition and analyzing the impact of the research of the candidate, **I confirm** that the presented academic achievements of the candidate Dr. Nora Angelova comply with the Bulgarian legislation, the requirements of the ADAPRB and the inner acts of Sofia University for holding the position “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 her scientific papers submitted at the competition.

My evaluation of the candidate is **strongly positive**.

II. GENERAL CONCLUSION

Based on the above, **I strongly recommend** the scientific jury to vote on a proposal to the Council of the Faculty of Mathematics and Informatics of Sofia University St. Kliment Ohridski to select Chief Assistant Prof. Dr. Nora Angelova Angelova for the academic position of “Associate Professor” in the professional field 4.6 Informatics and Computer Science (Computer Programming and Algorithms).

28th November 2019

Reviewer:
(Assoc. Prof. Dr. Svetla Boytcheva, ICT-BAS)

