

## REVIEW

on competition for the academic position of "professor" in scientific field 4 Natural sciences, mathematics and informatics, professional direction 4.6 Informatics and computer sciences, specialty Informatics announced in SG No. 87 on 15.10.2024 for the needs of the "Modeling and Optimization" department at IICT-BAS  
with only one candidate: Assoc. Prof. Dr. Nina Hristova Dobrinkova  
member of the scientific jury: Prof. Dr. Petya Doycheva Koprinkova-Hristova

### General conditions

I have been appointed as a member of the scientific jury by order No. 310 of 13.12.2024. of the director of IICT-BAS for the competition for the academic position "professor". The only candidate in the competition, Assoc. Prof. Nina Dobrinkova, has submitted all the documents required under the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Rules for its Implementation and the Rules for the Specific Conditions for Acquiring Scientific Degrees and Holding Academic Positions at IICT-BAS, namely:

1. Curriculum vitae according to the European model with attached lists of all publications, citations, projects and other activities;
2. Copy of diploma for the educational and scientific degree "doctor";
3. Certificate of internship in the specialty;
4. List of scientific publications for participation in the competition, which do not repeat those presented for the acquisition of the educational, scientific degree "doctor" and the academic position "associate professor";
5. Certificate of a useful model, as a scientific-applied result;
6. List of citations for participation in the competition, which do not repeat those presented for the acquisition of the educational, scientific degree "doctor" and the academic position "associate professor";
7. Summaries of scientific publications for participation in the competition - in Bulgarian and English;
8. Copies of the scientific publications for participation in the competition;
9. References for the fulfillment of the minimum requirements under Art. 2b, para. 2 and 3 of ZRAS in the Republic of Bulgaria and the requirements of IICT under Art. 2b, paragraph 5;
10. Reference to the original scientific and scientific-applied contributions;
11. Declaration that no plagiarism in scientific works has been proven according to the law;
12. Documents certifying management or participation in the implementation of projects.

### Biographical data for the candidate

Assoc. Prof. Dobrinkova received a bachelor's and master's degree in Informatics from Neophyt Rilski University in Informatics and a doctorate in Informatics in 2012 from IMI-BAN. She has successively held the academic positions of assistant, chief assistant (2012) and



associate professor (2016) at IIT-BAS and IICT-BAS. At the time of submitting the documents, she had a total work experience of 16 years and 1 month, of which 8 years and 3 months as an associate professor. She was specializing in the ICT-projects department of the Central European Bank in Frankfurt, as well as twice training at the Federal Forestry Agency's Fire Behavior Research Laboratory in Missoula, Montana, USA. She speaks English, German and Italian. She has extensive experience in writing, participating and leading a team in national and international projects, having participated in 19 international and 14 national projects. She is also wanted as an external expert to the Sofia Municipality, supporting activities related to DG ECHO projects, to the Sofia Civil Protection Squad. Her expertise is sought after by various institutions, for which she has written opinions, concepts and expertise (9 issues in total). Assoc. Prof. Dobrinkova was the editor of 3 thematic scientific collections, a member of the program and/or organizational committees of 6 scientific conferences and a member of the editorial boards of two international journals. She supervised one successfully defended doctoral student, 2 diploma students and 3 specialists; she was a member of 9 examination committees and wrote reviews and opinions on procedures for scientific degrees and titles (5 in total). Assoc. Prof. Dobrinkova is a member of the Academic Board of the Center for Research, Building and Improving NATO's Crisis Management and Disaster Response Capabilities. She was a member of the Scientific Council of IICT-BAS for the period 2018-2022.

#### **General characteristics of the candidate's research and scientific-applied activity**

A list of a total of 70 publications and 77 citations is attached to the applicant's CV. Some of them were used in her dissertation work and the procedure for occupying the academic position of "associate professor". In the current competition, the candidate participated with 1 monograph, 17 publications, 1 useful model and a list of 29 citations of her works. All scientific works of the candidate have not been used in previous procedures for obtaining academic titles or holding academic positions. They are referenced in the world-famous databases of scientific information (Scopus and Web of Science), and 11 of them are indexed (have SJR rank). The candidate is the sole author of 3 publications and the first author of 11 publications. For the monograph, which is co-authored Assoc. Prof. Dobrinkova has presented a separation protocol, from which it is clear that she has a significantly greater contribution (68%) to this work. The main part of the publications are reports at international conferences, and 5 of them are book chapters published in collections of the prestigious Springer international publishing house.

All citations are in Scopus-referenced publications, although two of them are marked by the candidate as only IEEE-referenced. It is noted that one of the citations (number 6 in the list of citations) was also used in the Associate Professor procedure (as seen by the NACID registration). However, according to this indicator, Assoc. Prof. Dobrinkova collects significantly more than the minimum requirements of the ZRAS of the Republic of Bulgaria and the specific requirements of the Regulations for the implementation of the law of IICT-BAS.

For the competition Assoc. Prof. Dobrinkova presented evidence of participation in 5 national and 6 international projects, which were not used in previous procedures. She was the head of 1 national and the Bulgarian team in all 6 international projects.

Evidence of the supervision of a successfully defended PhD student is presented.



The scientific-metric indicators of Assoc. Prof. Dobrinkova in Scopus are: 34 publications, 30 citations with h factor without self-citations 4, and in Scholar Google: 66 publications with 190 citations and h index 8.

The scientific-metric indicators of Assoc. Prof. Dobrinkova, according to the requirements of the ZRAS of the Republic of Bulgaria and the specific requirements in the Regulations of IICT-BAS for occupying the academic position "professor" are as follows:

Group	Min. points according to ZARS in RB	Points of candidate for ZARS in RB	Min. points according to IICT-BAS rules	Points of candidate for IICT-BAS rules
A	50	50	50	50
B	100	100	100	100
Г	200	463	260	317
Д	100	224	140	168
E	100	410	150	410
TOTAL:	550	1247	650	1045

It can be seen that the candidate not only fulfills, but even significantly exceeds the requirements according to all the criteria of ZRASRB and the Regulations of IICT-BAS.

### **General characteristics of scientific works**

The scientific papers with which Assoc. Prof. Dobrinkova participated in the competition, are related to her work on various national and international projects. A large part of them are co-authored with foreign scientists, which has allowed the application of theoretical developments not only in our country, but also abroad.

Most of the work is in the area of climate change and related risks of disasters and accidents such as floods [B1, Г12, Г15, Г16, Г17], fires [Г3, Г6, Г11, Г14], landslides [Г7] and other high-casualty incidents [Г2, Г10]. In the works of Assoc. Проф. Dobrinkova, modern ICT technologies are offered for modeling the development of processes in various disaster situations, supporting decision-making in order to deal with the consequences of disasters, optimizing the work of responsible authorities (regional and/or national), distribution of resources and rescue teams and training of participants in rescue operations [Г1, Г2, Г4, Г7, Г8, Г9, Г10, Г13]. Web and desktop applications have been developed to support the teams, which have been tested in real situations.

Another direction in the candidate's work is related to applications in healthcare. Theoretical models have been developed to support decision-making in epidemic situations [Г5]. Assoc. Проф. Dobrinkova is also the co-author of a useful model for the analysis and control of the mechanical properties of biological tissues with application in robotic systems for bloodless operations [Г18].

### **Contributions in the scientific works**

The contributions of Assoc. Prof. Dobrinkova in the works for participation in the competition can be summarized as follows:

1. Contributions with a scientific element:

- A methodology has been developed for calculating the inundation areas in case of floods based on geodetic surveys and Shezi's formulas for river runoff.
  - A five-level classification of floods is proposed, taking into account the frequency and magnitude of disaster damage.
  - A stochastic Dirichlet process model combining multiple models is developed to describe disease outbreaks with multiple sources.
  - Approaches have been developed for the simulation of forest and field fires, adapted to the specifics of the local flora in Bulgaria and its corresponding possible fuel models.
2. Scientific-Applied:
- The developed methodology for predicting the inundation areas during floods has been adapted and applied to test areas in the territory of Svilengrad municipality and in Armenia.
  - Web-based decision support modules and systems have been developed for disaster response services to help find the shortest route to medical teams and provide information to emergency services about infrastructure damage and human injuries requiring first aid.
  - Disaster Response System training modules have been developed in line with best practices for STEM training with digital resources.
  - A system for analyzing and controlling the mechanical properties of biological tissues has been developed, which provides additional sensitivity to manipulators used for robotic bloodless surgery.
3. Applied:
- The developed flood zones prediction methodology has been transferred into a desktop application that can be used both in the field and in the operating room by civil defense and volunteer groups for decision-making and resource allocation.
  - The developed web-based modules and decision support systems for the field response services have been applied to predict forest fires in the Zlatograd, Madan and Nedelino municipalities, as well as in Armenia.
  - The developed stochastic model using Dirichlet processes has been applied to predict the spread of the COVID19 virus.

### **Critical notes and recommendations**

I have no critical comments on the works of Assoc. Prof. Dobrinkova.

I believe that the field in which she has been working for years is very relevant due to the increased number of disasters worldwide as a result of climate change. Her developments have not only a scientific, but also a great applied contribution and have the potential for development and improvement in the future as well. I am impressed by her ability to work in large international teams and implement her developments at home and abroad.

I recommend her to continue her work actively in the future by publishing her results in addition to international conference proceedings and prestigious international journals.



## CONCLUSION

The candidate has met and exceeded the national minimum requirements and the requirements of IIC-T-BAS. I believe that Assoc. Prof. Dobrinkova has enough scientific, scientific-applied and applied contributions in the scientific works presented for the competition.

All this gives me reason to give a convinced **Positive evaluation** and to recommend the Scientific Jury to vote on a proposal to the Scientific Council of IIKT-BAS to choose **Assoc. Prof. Dr. Nina Hristova Dobrinkova** at the academic position of "**professor**" in scientific field 4 **Natural sciences, mathematics and informatics, professional direction 4.6 Informatics and computer sciences, specialty Informatics.**

Date: 12.02.2025

Jury:

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