

REPORT
on a competition for occupation of the academic position “Professor”
in professional field 4.6 Informatics and Computer Science
(Software Technologies – Data-Intensive Software Platforms),
announced in State Gazette No. 87 of October 19, 2021
by Sofia University St. Kliment Ohridski (SU),
Faculty of Mathematics and Informatics (FMI)

This report is prepared by Prof. Dr. Maria Nisheva-Pavlova from Sofia University St. Kliment Ohridski, FMI, as a member of the scientific jury for the competition according to Order No. ПД 38-593/10.12.2021 of the Rector of SU.

One applicant has submitted documents for participation in the announced competition: Dr. Dessislava Georgieva Petrova-Antonova, Associate Professor at FMI, SU.

1. General description of the materials presented

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 has submitted for the competition:

- Professional autobiography,
- Copy of diploma for higher education,
- Copy of diploma for educational and scientific degree “Doctor”,
- Copy of certificate for occupation of the academic position “Associate Professor”,
- Certificate of internship in the speciality,
- Documents proving the fulfillment of the requirements of Art. 115, para. 1, item 2 of RTCAADOAPSU,
- Lists of publications (list of all publications and list of publications presented at the competition),
- List of publications, presentations, projects and supervision activities, generated by the information system 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 in Scopus,
- Reference for original scientific contributions,
- Reference for the degree of fulfillment of the indicators under Art. 122, para. 2 of RTCAADOAPSU,
- Copies of publications presented at the competition,
- Abstracts of the publications presented at the competition (in Bulgarian and in English),
- Copy of the competition announcement in the State Gazette.

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

2. Details of the applicant

The applicant Assoc. Prof. Dr. Dessislava Petrova-Antonova has a technical degree, completed in 2000 at the Technical University – Sofia. In 2007 she received a doctoral degree. In 2007-2008 she worked as a senior assistant professor at TU – Sofia. In 2008-2009 she was a technical assistant at the Scientific Research Department at SU. From 2009 to 2012 she was a senior assistant professor in the Department of Software Technologies at FMI, and since 2012 she has been an associate professor in the same department. She also works as the head of a research group at the GATE Institute at Sofia University.

3. General characteristics of the applicant's scientific work and achievements

The research activities of Assoc. Prof. Dr. Dessislava Petrova-Antonova and the topics of her scientific works are entirely in the field of competition. The publications with which she participates in the competition do not repeat those of the previous procedures for the acquisition of her doctoral degree and for the occupation of the academic position of associate professor.

All scientific papers submitted for participation in the competition are co-authored. I have no doubt about the applicant's essential personal contribution in each of them.

There is no proven plagiarism in the scientific works of Assoc. Prof. Dr. Dessislava Petrova-Antonova.

In accordance with the requirements under Art. 1a, para. 1 of the RIADAPRB, the candidates for an the academic position of professor in professional field 4.6 Informatics and Computer Science must have: 50 points in group of indicators “A”, at least 100 points in group of indicators “B”, at least 200 points in group of indicators “Г”, at least 100 points in group of indicators “Д”, at least 150 points in group of indicators “E”.

RTCAADOAPSU does not define higher additional requirements than those specified in the RIADAPRB.

According to the submitted documents the applicant covers:

- 50 points in group of indicators “A”,
- 240 points in group of indicators “B”,
- 288 points in group of indicators “Г”,
- 624 points in group of indicators “Д”,
- 250 points in group of indicators “E”.

Therefore, the minimum national requirements and the additional requirements under Art. 1a, para. 2 and para. 3 of the RIADAPRB for occupation of the academic position of “Professor” in the professional field 4.6 Informatics and Computer Science have been completely covered and exceeded by Assoc. Prof. Dr. Dessislava Petrova-Antonova.

4. General characteristics of the applicant's teaching activities

The teaching activities of Assoc. Prof. Dessislava Petrova-Antonova are considerable in scope and diverse in content. She teaches the compulsory courses in Quality Management and Design and Integration of Software Systems for BSc students in Software Engineering at FMI. She teaches also

the courses in Service-based Software Systems, Testing of Software Systems, Integration of Distributed Systems and Big Data Management and Processing for different Master's programs at FMI.

Assoc. Prof. Antonova is the supervisor of the Master's program in Technology Entrepreneurship and Innovation in Information Technology at FMI. She supervised 39 successfully defended MSc theses. She was the research supervisor of one successfully defended PhD student and currently supervises two PhD students.

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

The scientific papers, presented by Assoc. Prof. Dr. Desislava Petrova-Antonova for participation in the competition, contain original research results in the field of design and development of data-intensive software platforms. The main contributions of the applicant relate to three aspects of this category of software platforms: architectural principles, technologies for building and maintaining the life cycle, principles of working with large volumes of heterogeneous data. These aspects are present in the applicant's works both at abstract level and in terms of the specifics of many complex areas of application: smart cities, healthcare, education, Internet of Things. The most significant results presented in the competition materials can be grouped and summarized as follows:

- Group 1: *Reference architectures for big data platforms*. An open reference architecture for a big data platform is proposed that supports the full data lifecycle and allows the development of new software tools that can be provided as services.
- Group 2: *Data-intensive software platforms in the field of smart cities*. An innovative technological framework for creation and visualization of a semantic 3D city model has been developed, which is part of a complex platform implementing technology for modeling and management of urban processes (the so-called city digital twin). 3D semantic models of two regions of Sofia have been built. A software platform for monitoring, collecting, aggregating and visual analysis of air quality data from various sources has been created. The proposed solution is flexible enough and allows easy integration of new data sources. An architecture of a software platform for calculating indicators for the assessment of smart cities has been developed.
- Group 3: *Data-intensive software platforms in the field of healthcare*. An innovative software platform for the assessment of cognitive disorders in patients with multiple sclerosis has been created, which also provides appropriate rehabilitation of the patient. A scalable architecture of a platform for collecting, storing, processing, analyzing and visualizing data about cognitive diseases is proposed.
- Group 4: *Data-intensive software platforms in the field of the Internet of Things*. Architecture and prototype of a platform for real-time monitoring, detection and automatic regulation of high levels of carbon emissions from vehicles have been developed. An extendable integration framework for communicating a variety of devices from the Internet of Things has been proposed.

In my opinion, the aforementioned results characterize the candidate Assoc. Prof. Dr. Desislava Petrova-Antonova as a well-established scientist with significant achievements, which give reason to claim that she completely covers the concept of a leading researcher in the field of informatics.

The significance of the applicant's research results is evidenced by their reflection in the works of other authors. Dr. Dessislava Petrova-Antonova submitted data for a total of 142 citations of her publications in articles of other authors, 86 of which were referenced and indexed in Scopus.

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 Assoc. Prof. Dr. Dessislava Petrova-Antonova. I am aware of the fact that serious research in the scientific field in which she works is generally a collective matter, but I recommend her to aspire in her future work to some single-authored publications, presenting results to which she has a key contribution. I also recommend her to pay more attention to the professional terminology she uses in Bulgarian.

7. Personal impressions of the applicant

I have excellent personal impressions of the professionalism, precision, thoroughness and efficiency in the work of Assoc. Prof. Dr. Dessislava Petrova-Antonova. I highly appreciate her cooperativeness and her ability to bring what she started to a successful end.

8. Conclusion on the application

Having become acquainted with the materials and scientific works presented in the competition and on the basis of the analysis of their significance and the scientific and applied scientific contributions contained therein, I **confirm** that the academic achievements of the candidate Assoc. Prof. Dr. Dessislava Petrova-Antonova meet the requirements of the ADAPRB, the Regulations for its implementation and the corresponding Regulations of SU for the occupation of the academic position of "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.

I give a **positive assessment** of the application of Assoc. Prof. Dr. Dessislava Petrova-Antonova.

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 Assoc. Prof. Dr. Dessislava Georgieva Petrova-Antonova for the academic position of "Professor" in the professional field 4.6 Informatics and Computer Science.**

February 4, 2022

Assessor:

(Prof. Dr. Maria Nisheva-Pavlova)