REPORT

for the competition of academic position of 'Docent' for the needs of IMI - BAS, announced in State Gazette issue 8/26.01.2024.

Professional direction: 4.5 'Mathematics',

Speciality: Probability theory and mathematical statistics

by a member of the Academic Jury, Prof. Dr. Sc. Eugenia Stoimenova from the Institute of mathematics and informatics - BAS

I am presenting my report related to this procedure as a member of an Academic Jury, formed with Order No. 64/21.03.2024 of the Director of IMI. One applicant has presented the required documentation for participation in the procedure: Dr Assen Tchorbadjieff.

1. General description of the presented materials

Dr. Assen Chorbadjieff presented 18 scientific publications for participation in the competition. All of them are published in specialized international publications suitable for the field of the competition.

6 of the papers are published in journals with an impact factor, 3 of which are in Proceedings of BAS, 2 papers are in Journal of Applied Statistics and 1 paper is in Lithuanian Mathematical Journal. 4 of the remaining papers are published in journals without an impact factor, but indexed in Scopus with SJR – 3 papers are published in Modern Stochastics: Theory and Applications and 1 paper is published in the European Journal of Geography. A list of 15 citations is presented.

It can be concluded from the submitted documents and declarations that:

- the scientific publications meet the minimal national requirements as well as the additional requirements given in the Rules for the conditions and regulations for acquiring scientific degrees and occupying academic positions in the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, for occupying the academic position "Docent" (Associate Professor) in the professional field of the competition;
- the scientific publications submitted for the competition have not been used in previous applications for acquiring a scientific degree or occupying an academic position.

2. Information about the applicant.

Dr. Assen Chorbadjiev is graduated from the master's program "Engineering Physics" at the Faculty of Physical Science of the State University "St. Kliment

Ohridski" in 2006. In the period 2008-2013 he was a doctoral student at the Institute for Nuclear Research and Nuclear Energy of the BAS. He defended his thesis for a "Doctor of Physical Sciences" in 2013. Since 2015, he has been a chief assistant at the Institute of Mathematics and Informatics of the Bulgarian Academy of Sciences in professional direction 4.5 Mathematics, scientific specialty "Theory of Probability and Mathematical Statistics".

3. General characteristic of the scientific work and achievements of the applicant

The scientific interests and the papers presented for the competition by Dr. Chorbadjieff are in two main thematic directions.

The results in the first group of papers relate to statistical models of cosmic rays and atmospheric, geomorphological processes and geostatistics. The models are based on empirical data, and ensuring the quality of the data has been one of Assen's tasks in the collective research. Time series were used to model the atmospheric aerosol quantities associated with the pollutant transport process over Musala, and the transport was confirmed by simulations of air transport trajectories using the HYSPLIT model. Another model for the transboundary transport of Saharan sand has been investigated, and a computationally intensive software system has been developed to automate the tracking. It is based on the automated processing and combination of satellite data for the NASA Aqua/AIRS dust index and air transport trajectories using the HYSPLIT model. The results have been published in 7 scientific papers in this thematic direction.

Research in branching processes involves developing models based on a random branching mechanism. The first such model is for a process generated by branching based on a probability distribution. The influence of the initial conditions on the development of a branching process was investigated. The generating function of a supercritical Markov process with specific distributions is derived in an explicit form. The work on branching processes with a geometrically distributed propagation mechanism is completed by finding the solution of the inverse Kolmogorov equation in the supercritical case. The results include finding the probability distribution of the number of living particles at a given time.

Three other papers are not included in the fields described, but their content is in the field of the competition.

In general, I consider that the candidate's scientific and scientific-applied results contain novelty for science and have direct application in various fields of science.

The applicant has submitted a list that contains 15 citations. 7 of them, are on work, included in the competition procedure. Most of the publications are co-authored. I consider the applicant's contribution to the joint publications to be equal to the contributions of the co-authors.

Asen Chorbadjiev has participated in four national scientific projects financed by the Scientific Research Fund of the Ministry of Education and Science.

4. Critical remarks

I have no critical remarks on the candidate's scientific work. It is clear from the review of the materials submitted for the competition that Assen Chorbadjiev works on actual problems in the field of applied mathematics.

5. Conclusion.

After my careful and critical reading of the documentation and the publications presented for the competition and my analysis of their significance and the scientific and scientific-applied contributions, I confirm that the scientific contributions Dr. Assen Chorbadjieff meet the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its application, and the Rules for the conditions and regulations for acquiring scientific degrees and occupying academic positions in the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, for occupying the academic position "Associate Professor" in the scientific area and the professional field of the competition.

I recommend the Scientific Jury to propose to the Scientific Council of IMI to elect Dr. Assen Chorbadjieff as a Docent in professional field 4.5 Mathematics, scientific specialty Probability theory and mathematical statistics.

Sofia, 9 юни 2024 г. Signed:

Eugenia Stoimenova