Young Researcher position

Mentor: assist. prof. dr. Lovro Šubelj

Field of research: network science, methods and algorithms for data analysis

Large complex networks or graphs are ubiquitous in everyday life. Examples include online social networks, the World Wide Web, wiring of a neural system, terrorist affiliations, plumbing systems and human brain. Many such real-world networks reveal characteristic patterns of connectedness that are far from regular or random. Networks have thus been a prominent tool for investigating real-world systems since the 18th century. However, while small networks can be drawn by hand and analyzed by a naked eye, real-world networks require specialized computer methods and algorithms, modern analytical techniques and mathematical models. This led to the emergence of a new interdisciplinary scientific field about 20 years ago called network science, which is currently one of the fastest growing areas of data analysis and also the entire science. According to leading researchers, network science is nuclear physics of the 21st century.

In recent years, network analysis has also been accelerated for the study of science itself. Using modern bibliographic and other databases, and other methods of data collection, a number of different networks can be constructed, such as networks of references between scientific papers, patents, publications and areas, collaborations between researchers and research institutions, various affiliation networks etc. Analyses of such networks can answer numerous open problems in modern bibliometrics and scientometrics. For example, automatic identification of scientific fields and future research trends, identification of key papers and patents for the development of a selected field, measurement of reliability, reproducibility and interdisciplinarity of research, automatic evaluation of researchers, institutions and countries etc. These problems are far from being solved and require the knowledge of mathematical modeling, statistics and graph theory, modern computing and programming technologies, data analysis and selected areas of artificial intelligence, bibliometrics and scientometrics, knowledge of research work, and scientific analysis, writing and publishing.

The above forms the starting point for the training and work of the junior researcher, which is supposed to be completed with a doctorate of science. The emphasis will be on the development of methods and algorithms for data analysis of large bibliographic databases and solving selected mentioned problems. Concrete problems will be selected with the help of researchers from the leading international institution for the study of science (CWTS, University of Leiden). Besides the applicative contribution in the field of bibliometrics and scientometrics, the work will strive towards the development of general approaches, which could also be used for the analysis of other types of networks.

As a part of the training of the junior researcher, it is expected from him/her to integrate into vatious forms of international research work, publication of the major conclusions of research

work in scientific journals and presentation at scientific events, and active participation in the international research community.

In the selection process, candidates with the following skills and qualifications will be preferred: e good knowledge of English language;

- knowledge of modern methods of data analysis;

- good knowledge of programming technologies and languages;

- possible experience in the field of bibliometrics and scientometrics;

- experience with research work and scientific writing.