

The 13th National Information Day: Open Science, Open Data, Open Access, Bulgarian Open Science Cloud

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Abstract. The paper gives an overview the current landscape and the activities on national and institutional level regarding Open Science, Open Access to scientific information, Open Data and the overall development of the Bulgarian Open Science Cloud.

Keywords: Open Access, Access to Knowledge, Open Science, European Open Science Cloud, Bulgarian Open Science Cloud.

1 Introduction

The 13th National Information Day is devoted to the presentation of successful initiatives and projects for open access (OA), open data sharing and open science; strategies for promotion of OA; development of the Bulgarian Portal for Open Science and the national repository; development of the Bulgarian Open Science Cloud; copyright and licenses under OA; best practices and examples of policies for the development and promotion of open access at the national and institutional levels, etc. The event will support academic staff, research project managers, policy-makers and staff working in research funding bodies. It will demonstrate the main concepts for the implementation of OA principles and a national OA roadmap, key terms, strategies, business models, work plans, copyright and licenses, best practices, examples and policies for OA, open data and open science.

The European Open Science Cloud (EOSC) forms an ecosystem of research data and related services that enable and enhance access and reuse of FAIR research outputs. EOSC Future is one of the main H2020 funded projects that will steer the implementation of the EOSC Core development in collaboration with the other funded EOSC-related projects in the landscape (including the regional projects, the cluster projects,

FAIRsFAIR, the INFRAEOSC-07-2020 projects, OCRE, etc.). Bulgarian scientists are working in many areas of the EOSC.

2 Bulgaria OA Journals, Repositories and Portals

The total number of OA journals in Bulgaria (DOAJ: Directory of Open Access Journals) is presented in Figure 1. The subjects of indexed Bulgarian journals include: Agriculture, Auxiliary sciences of history, Bibliography. Library science. Information resources, Education, Fine Arts, General works, Geography, Anthropology, Recreation, History America, History (general) and history of Europe, Language and Literature, Law, Medicine, Military Science, Music and books on Music, Naval Science, Philosophy, Psychology, Religion, Political science, Science, Social Sciences, Technology. The license types and review types are the following: License types: CC BY - 49, CC BY-NC - 10, CC BY-NC-ND - 17, CC BY-NC-SA - 2, CC BY-SA – 3, CC0 (“No Rights Reserved”) – 1, Publisher's own license -1. Review types: Double blind peer review – 29, Peer review – 26, Blind peer review- 24, Open peer review – 2, Editorial review – 1. Data for the Open Access Bulgarian repositories in 2022 are shown in Figure 2.

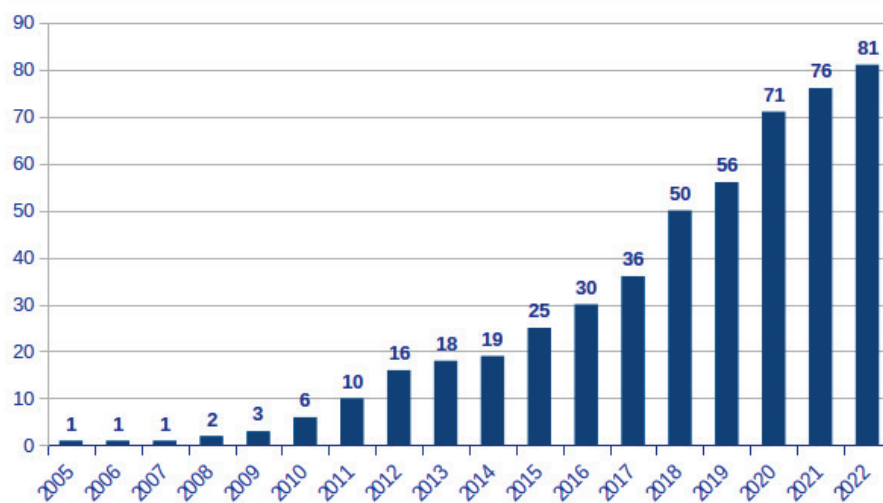


Fig. 1. Total number of open access journals in Bulgaria

Table 1. Open Access Bulgarian repositories in 2022

Open Access Bulgarian Repositories 2022	Software	Link
New Bulgarian University Repository	EPrints 3.4.3 OAI 2.0	http://eprints.nbu.bg

BulDML at IMI-BAS	DSpace 1.6 (<i>In process of migration to Dspace 7.3</i>)	http://sci-gems.math.bas.bg
Digital repository of Sofia University	DSpace 1.8.2	https://research.uni-sofia.bg
D.A.Tsenov Academy of Economics - Digital Library	DSpace 6.3-SNAPSHOT	http://dlib.unisvistov.bg
Academic Research Repository at the Burgas Free University	Dspace 1.8.1	http://research.bfu.bg
Central Medical Library - MU, Sofia	Dspace 6.3	http://cml3.mu-sofia.bg:8080/xmlui
Medical Academic Repository - Medical University - Varna Prof. Dr. Paraskev Stoyanov	Dspace 6.2	http://eprints.mu-varna.bg
BGOpenAIRE at IMI-BAS	DSpace 1.6.2 (<i>In process of migration to Dspace 7.3</i>)	http://www.bg-openaire.eu
Bulgarian Portal for open science (BPOS)	Elastic	https://bpos.bg/

The existing Bulgarian National (open datasets) Portals are:

- **Bulgarian portal for open science** (<https://bpos.bg/>). The National repository is multidisciplinary and welcomes doctoral dissertations and peer reviewed manuscripts or published versions of scientific publications, created by researchers. The items need to be described by a mandatory set of metadata: author/s, title, publication date, resource type (e.g. journal article, part of a book, conference paper, report, etc.), resource identifier (e.g. DOI, Handle), access rights (open, metadata only, restricted, embargoed access). The system also performs selective harvesting of metadata from Bulgarian institutional repositories with open access that support the Open Archives Initiative Protocol for Metadata Harvesting. It is also integrated with the national database for doctoral dissertations in the Register of academic staff.
- **Open Data portal** (<https://data.egov.bg/>). Access to public open data sets in machine-readable format. It contains about data sets from organizations. This portal provides REST based API. Supported main formats for datasets are CSV, JSON, XML. The system is based on Elastic search engine. The following topics are included: Agriculture, Fisheries, Forestry & Foods, Education, Culture and Sport, Environment, Energy, Transport, Science & Technology, Economy and Finance, Population & Society, Government & Public Sector, Health, Regions & Cities, Justice, Legal System & Public Safety, International Issues.

- **National Statistical Institute** (<https://www.nsi.bg>) like the Open Data Portal provides free and unrestricted access, but for selected data sets in machine-readable data formats in CSV, JSON.

3 The Main Open Science Activity in Bulgaria – 2021-2022

The National Priorities within the OS Initiative:

- Provide the necessary trusted infrastructure for long-term storage, sharing and access to scientific publications and other research results from publicly funded research.
- Foster new skills and competences.
- Raise awareness on Open Science and ensure the active involvement of researchers, universities and research organizations.
- Consolidate ambitions and planned actions in the National Open Science Plan.

National Policy and Infrastructure

Bulgaria has a National Open Science Plan since January 2021. The general ambition of the plan is to provide the research community and society with access to scientific publications and research data in an open and non-discriminatory way at the earliest stage possible and ensure the possibility for their use and re-use. The plan provides for the adaptation of the national policies, initiatives and research infrastructures with a view to integrating and creating conditions for inclusion and interoperability with the European Open Science Cloud.

In October 2021 the Council of Ministers adopted a national program aimed to induce the publication activity of the scientific research staff and increase the number of scientific publications in authoritative scientific journals, referenced or indexed in the global databases Web of Science or Scopus, as well as promote the culture of sharing scientific information with open access. The program covers a three and a half period of time (2022-2025) and one of the eligibility criteria for the beneficiaries of the program (universities and research organizations) is to have a valid BPOS account as a content provider. Funds under the program are aimed to serve as additional work remuneration, awards or other financial incentives to research staff for scientific publications in journals (including open access) referenced or indexed in the global databases Web of Science or Scopus in the previous calendar year.

In March 2022 the Bulgarian Portal for Open Science was certified as a Trustworthy Data Repository by the CoreTrustSeal Standards (https://www.coretrustseal.org/wp-content/uploads/2022/03/20220307-Bulgarian-Portal-for-Open-Science_final.pdf). The national repository underwent the rigorous certification process and provided sufficient evidence that its procedures, documentation, metadata and technical infrastructure meets the sixteen requirements formulated by CoreTrustSeal. The requirements concern important issues such as the measures taken to guarantee the integrity and authenticity of scientific resources, the existence of documented processes and procedures

for storage, the mechanisms for checking and ensuring the quality, relevance and comprehensibility of the scientific resources, the use of reliable hardware and software solutions, as well as the measures taken to protect the resources, services and users. The certification procedure is meant to provide transparency of the work processes of BPOS and demonstrate its compliance with the latest standards in the field of research data management and long-term preservation.

As a result of the continuous efforts of the universities, research organizations, the Ministry of education and science and the National center for information and documentation, the number of open access publications in the BPOS is increasing. By July 2022 the number of scientific publications available in BPOS exceeds 31 000, out of which 89 % are published with open access from 99 registered content providers (including universities, research organizations, hospitals and publishers).

In June 2022 the Ministry of Education and Science concluded a new agreement with one of the main scientific publishers. The agreement with Elsevier is in implementation of the National Strategy for the Development of Scientific Research in the Republic of Bulgaria and provides subscription access for higher schools and scientific organizations to the publishing house's databases.

The new agreement is concluded for the period 2022-2025 and offers an extended scope of the subscription, which also includes a subscription to e-books for the entire period, as well as the organization of an extended seminar on the development of scientific activity in the system of higher education.

The biggest success of the agreement between the Ministry of Education and Science and the publishing house is the "Open Access" pilot project. The service grants the right to publish open access articles in the main hybrid journals owned by Elsevier and published by the publisher. Corresponding authors may publish a specified number of open access articles within the term of the agreement without paying a publication fee. In the event that the maximum number of articles per subscription year is reached, the agreement provides for preferential prices for Bulgarian users included in the list of users.

Open Data and Cloud Computing National Initiative in Bulgaria

On December 9, 2021, nine scientific organizations signed a Memorandum of Understanding (MoU) establishing the National Open Data and Cloud Computing Initiative (NI ODCC) in order to create synergies at national level between organizations with a role and interest in the European Open Science Cloud (EOSC); integration of open data infrastructures (storage) and cloud computing (services) in the EOSC; supporting activities to optimize services for research and innovation; sharing and disseminating information about the capabilities of the infrastructure, services and expertise of the participants, about their work and achievements. The final document was prepared after a 6 months' intensive work of an initiative WG following the recommendations given at the EOSC symposium in 2021 and by the models, developed in the framework of NI4OS-Europe project, and several presentations including the discussion during the National Information Day on Open Science held on 23 of September 2021.

The coordinating organization of the initiative is the Institute of Information and Communication Technologies, Bulgarian Academy of Sciences (www.iict.bas.bg). Partners are several institutes of the Bulgarian Academy of Sciences - The Institute of

Mathematics and Informatics (www.math.bas.bg), The National Institute of Geophysics, Geodesy and Geography (www.niggg.bas.bg), The Institute of Mechanics (www.imbm.bas.bg), as well as Bulgarian universities - Sofia University "St. Kliment Ohridski" (www.uni-sofia.bg), Technical University – Sofia (www.tu-sofia.bg), Medical University – Sofia (www.mu-sofia.bg), University of Plovdiv “Paisii Hilendarski” (www.uni-plovdiv.bg) and University of Library Studies and Information Technologies – Sofia (www.unibit.bg). The MoU remains open for new members to join – the contact person is Prof. Aneta Karaivanova, IICT-BAS (anet@parallel.bas.bg).

In 2022 the organizational structure was agreed and a set activities of the NI ODCC to implement the National Plan for Open Science were planned. These activities include:

- Identification of digital resources, general and thematic cloud services at national level, provision of technical assistance to ensure compliance with EOSC requirements and recommendations;
- Development of a strategy for synchronization/development of advanced methodologies for accessing and sharing data such as user interfaces, federation of resources, tools for identification, authorization and accounting;
- Identify a path for possible development of this agreement to administrative structures or a consortium for participation in national or European projects;
- Coordinate cooperation in the development of solutions for the operation and monitoring of infrastructure based on specific tools and open data, compatible with EOSC;
- Supporting the academic, research and innovation community to develop specific opportunities by organizing national and international events and providing the specific training needed for the transition to open science;
- Promoting FAIR principles (availability, accessibility, interoperability, reusability) and their acceptance by research data providers;
- Identifying and stimulating the opportunities for the impact of EOSC on projects in the National Roadmap of Research Infrastructures in Bulgaria and other research infrastructures.

In 2022 the teams of IICT-BAS and IMI-BAS already started with development and provision of training materials on open data and cloud computing to the academic community; technical assistance to ensure compliance with EOSC requirements and recommendations for digital resources related to open data and cloud computing; promotion of EOSC and FAIR principles (discoverability, accessibility, interoperability, reusability) and their adoption by scientific data providers.

Training and Support

The National Centre for Information and Documentation, the Ministry of Education and Science and NOSCI continued their joint efforts to raise awareness on Open Science and ensure the active involvement of researchers, universities and research organizations.

Series of events were held jointly by NACID and the Ministry of Education and Science, RPOs and infrastructures on the topic “Building a common vision towards Open Science”. The speakers presented the concept of open science, the advantages of

disseminating research, the features of open access publications and opportunities to optimize the research process thanks to the Bulgarian Open Science Portal and the national repository. The information and examples were tailored to the audience and practical examples were given. The events included fruitful discussions with the participants, answering all their questions related to the use of the portal and the benefits for scientists.

Researchers have access to a useful set of documents related to the work of the National repository, including a Long-term storage and preservation policy of the national repository, description of the Deposit process in the national repository, Deposited items lifecycle, a Deposit agreement, etc. (<https://bpos.bg/en/documents>). Users can also freely access records of trainings on how to use BPOS (https://www.youtube.com/channel/UChh_B8mibrs2ADP1qF67qJQ/featured).

The Institute of Information and Communication Technologies at BAS started organizing a series of Open Science capacity building events. The main goal of these training events is to give an opportunity to the trainees to gain knowledge and skills about different aspects of EOSC, FAIR principles, OpenAIRE, NI4OS, certification and open research data management (ORDM). In November 2021 the second training for Bulgarian end-users was held online (due to the Covid-19 situation) (<https://events.ni4os.eu/event/59/overview>). The program of the training included presenting the policy and rules of access to EOSC and NI4OS services, short description of main services in the EOSC catalogue and detailed description of services and digital repositories developed by the NI4OS-Europe partners. A special attention was given to the services developed by the Bulgarian team. The Bulgarian team (IICT and IMI) is a core partner in the NI4OS project and contributed to development of all type of services: core services (accounting), generic services (HPC, cloud, storage), thematic services (in the area of climatology) and repositories.

In July 2022, a team of the Ministry of Education and Science went through training for the implementation of the transformative agreement with Elsevier. This way, the conditions were prepared for the promotion of publications on open access and for the verification of publications' requests within the framework of the agreement. So far, a series of consultations have been done, news has been spread and the first few publications have been verified.

Outreach and Dissemination

The Bulgarian member of the Steering Board of EOCS participated to a EOCS survey on the national efforts undertaken so far for the implementation of this measure of the open science initiative.

IICT-BAS presented the already established National Initiatives for Open Science in Europe (including Bulgarian national initiative) at two conferences held in the reporting period: International Conference of the Bulgarian section of SIAM (December 2021, Sofia, IMI premises), and, the Annual Conference of the Union of the Bulgarian Mathematicians, (5-9 April 2022 in Tryavna, Bulgaria).

A Documentary about open science policies in Bulgaria was released by the RDA BG Node (<https://www.youtube.com/watch?app=desktop&v=4HWsfZtQt7k>).

Task Forces

- Participating in the European Open Science Cloud – Steering Board;
- Sofia University became a member of the EOSC-Association <https://eosc.eu/members/sofia-university-st-kliment-ohridski>;
- Participating in the Research Data Alliance;
- Participating in the National Initiatives for Open Science in Europe – NI4OS-Europe (IICT-BAS and IMI-BAS);
- Participating in the OpenAIRE AMKE (IMI-BAS);
- Participation in EOSChub and EGI-ACE (IICT-BAS);
- Participation in the EOSC TF on Data Interoperability (IICT-BAS).

4 National Information Day 2022 “Open Science, Open Data, Open Access, Bulgarian Open Science Cloud”: Topics for discussion

- Bulgarian roadmap for open science;
- European Open Science Cloud and EOSC Association;
- National Scientific Program “Stimulation of publication activity in respectable international scientific journals and open access to scientific information”;
- Bulgarian portal for open science and the national repository;
- Institutional repositories and other e-infrastructures;
- FAIR data requirements and tools;
- Transformative agreements with publishers;
- Open Data;
- Open Sources;
- Open Access Indicators;
- Best Practices;
- Discuss the Possibilities of Establishing a Network of Open-Access Repositories;
- Contribute to the problems of the Harmonization of National Legislation and Practices.

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