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FIRST HALF OF THE FLOW PROJECT – METHODS, PRACTICES AND FIRST RESULTS

ABSTRACT

The paper summarises the results achieved during the first 18 months of the project THE FLOW (Interactions-Transmission-Transformation: Long-distance connections in Copper and Bronze Age of the Central Balkans). The project team has visited 12 museums in the territory of Central Serbia and accumulated a total of 5,000 km of road trips. More than 400 pottery samples from 67 archaeological sites were collected for provenance analyses, thermoluminescence and optically stimulated luminescence dating. Samples have also been collected from more than 150 bronze and 64 copper artifacts, as well as more than 25 samples from clay pits and ore deposits.

A total of 30 samples from obsidian artifacts have been collected. Following the collection of samples, procurement procedures were conducted for AMS and TL/OSL dating, as well as calls for isotopic analyses of copper and tin provenance. Contracts for TL/OSL analyses have been signed with Instituto Universitario de Geología “Isidro Parga Pondal” from La Coruña (Spain), and for AMS analyses with Isotoptech Zrt. from Debrecen (Hungary), and Rutgers University in New Jersey (USA).

Laboratory research within the project has so far brought many important results, among which are those on the origin of the raw materials for making the analysed ceramic vessels, as well as the pigments used for their decoration. Extremely significant data was obtained on the composition of the analysed items made of metal - weapons and jewellery, on the basis of which preliminary conclusions were

made about the technology of their production, and them belonging to a certain region or workshop.

The project initiated the creation of a network of scientific collaborations that can be continued through future joint projects and applications on international calls. The following project activities will be aimed towards the consolidation of already established methodological procedures as well as the interpretation of the awaited outcomes and their integration into explanatory models of complex processes in the societies in later prehistory.

KEYWORDS: POTTERY, COPPER, BRONZE, OBSIDIAN, PROVENANCE STUDIES, ISOTOPIC ANALYSES, ABSOLUTE DATING.

INTRODUCTION

The inspiration behind THE FLOW project was grounded in the rising number of confirmations that the communities of later prehistory lived in a dynamic world, which swiftly changed through the circulation of people, material goods, and ideas. In archaeology, imports are traditionally recognised as objects whose physical appearance and characteristics single them out from the corpus of local materials. Such objects, found within archaeological contexts, are observed as a result of the exchange/trade of finished products and/or raw materials. Although the stylistic and typological analyses of presumably non-local objects represent the main methodological procedure, THE FLOW project has set up a multidisciplinary research framework for their systematic examination, with the utilization of state-of-the-art methods both in archaeology and science, with a particular focus on the origin, spatiotemporal distribution and analyses of networks of contacts. The research programme of the project was formed with the goal to study the origin and mechanisms of circulation of selected artifacts made of copper, obsidian, pottery, and bronze, throughout the Copper and Bronze Age, which originated from reliable archaeological contexts from key sites.

Spatio-temporal models were selected as the analytical framework to model the absolute dates of sampled objects and the disposition of raw materials, previously collected by the application of innovative analytical procedures. An attentive reconsideration of traditional archaeological and anthropological theoretical scopes regarding long-distance connections will serve as a base for the proposal of new models of interactions between prehistoric populations of South-eastern

and Central Europe, from a Central Balkans perspective.

The formation of a database that serves as a reference collection of provenance analyses of artifacts and raw materials, and information on their archaeological context and radiocarbon dates, will represent a contribution to solving the long-standing problems of regional archaeology. Results achieved so far, integrated into a unique system with the currently ongoing research, will offer a new insight into the nature and direction of connections that had a significant impact on the formation of social transformations in the later prehistory of the Balkans (Bulatović *et al.* 2022).

In the first 18 months of the project, the team has visited 12 museums in the territory of Central Serbia and accumulated a total of 5,000 km of road trips. Furthermore, more than 400 pottery samples from 67 archaeological sites were collected for provenance analyses, thermoluminescence and optically stimulated luminescence dating. Samples have also been collected from more than 150 bronze and 64 copper artifacts (**Figure 1**), as well as more than 25 samples from clay pits and ore deposits. A total of 30 samples from obsidian artifacts have been collected. Following the collection of samples, procurement procedures were conducted for AMS and TL/OSL dating, as well as calls for isotopic analyses of copper and tin provenance. Contracts for TL/OSL analyses have been signed with Instituto Universitario de Geología “Isidro Parga Pondal” from La Coruña (Spain), and for AMS analyses with Isotopech Zrt. from Debrecen (Hungary), and Rutgers University in New Jersey (USA). Two out of three of the aforementioned institutions had no previous scientific collaboration with the Institute of Archaeology in Belgrade and, therefore, THE FLOW project initiated the creation of a network



Figure 1. Sampling of copper and bronze artifacts at the National Museum, Šabac (photo from the archive of the project).

of scientific collaborations, that can be continued through future joint projects and applications on international calls (e.g., Horizon EU).

PREHISTORIC POTTERY IN FOCUS

In terms of the case study of the origin of raw materials, and the production and utilisation of pottery, the first methodological steps implied the formation of a database (bibliographic prospecting and data on unpublished materials), the collection and stylistic, typological and chronological analyses of pottery, and the preparation of samples for the following analytical procedures.

Collected, processed and prepared pottery samples come from Bronze Age sites in the territory of Serbia: Sokolica in Ostra and Slatina in Gornja Gorevnica from the collection of the National Museum in Čačak, and Židovar in Orešac from the archaeological collection of the Faculty of Philosophy of the University of Belgrade and the City Museum of Vršac. Regarding the complex procedure for determining the origin of pottery, which includes the comparison of similarities between artifacts from archaeological contexts, comparisons of the material composition of a specific group of potsherds and a comparison

with the clay source in the vicinity of the site, clay samples were collected from the sites of Židovar, Sokolica, and Slatina.

The aforementioned sites were selected for this case study based on several specifics. The site of Židovar holds a dominant position in the south of the Pannonian Plain (**Figure 2**) and with its multi-layered character of a *tell* settlement (Ljuština 2013: 101–112), provides a good possibility for research into the prevalence of traditional methods and/or innovation in the process of pottery production during the Early and Middle Bronze Age. Furthermore, the site provides insight into specific artifacts that reached the site through trade and exchange networks on both regional and supra regional levels. The comparative study on the provenance of raw materials will allow for the recognition of local specifics in clay preparation. The practice of a similar, yet specific, method of clay preparation has been recorded for Middle Bronze Age pottery workshops in southern Pannonia, and at other sites attributed to the Vatin culture (Gómez-Gras *et al.* 2021: 71–92).

In contrast to Pannonian *tell* settlements, which flourished during the first half of the 2nd millennium BCE (Љуштина 2022: 37–51), contemporary settlements in the territory of Central and western Serbia are practically “invisible” and



Figure 2. Židovar in Orešac (photo by Marija Ljuština, documentation of the University of Belgrade – Faculty of Philosophy, Department of Archaeology).

poorly researched. Sokolica in Ostra (**Figure 3**) and Slatina in Gornja Gorevnica (Dmitrović and Ljuština 2021: 155; Љуштина 2022: 140–146) represent two of the few settlements from the West Morava region, which highlights the importance of data on Bronze Age pottery production. Typical Middle Bronze Age pottery recorded in the settlements of Ostra and Gornja Gorevnica



Figure 3. Sokolica in Ostra (photo by Katarina Dmitrović, see also in: Ljuština and Dmitrović 2023: forthcoming).

can be attributed to the Bubanj-Hum IV-Ljuljaci cultural domain (Bulatović 2021: 136–143). Such an attribution does not exclude the possible influence of the ceramic production of the Vatin cultural domain on the production and the stylistic development of Bubanj-Hum IV-Ljuljaci pottery.

During the 1980s, Middle Bronze Age cemeteries with incinerated deceased were recorded in the territory of present-day cities of Bor and Zaječar in eastern Serbia. In contrast to Bronze Age communities of the Pannonian Plain, communities of the given territory were particularly focused on copper exploitation in the richest ore-bearing area in the Balkans (Вујадиновић 1953: 56; Jovanović 1980; Jovanović 1982; Pernicka *et al.* 1993; Petković 2009; Mehofer *et al.* 2021). THE FLOW project includes thermoluminescence analyses of ceramic urns previously dated by the 14C method, which originated from enclosed contexts from the Trnjane and Hajdučka Česma necropolises near present-day Bor.

In the course of the excavation campaign at the site of Velika Humska Čuka (Mladenović *et al.* 2023), in July 2022, members of the project team conducted in-situ analyses of reconstructed vessels from the collection of the National Museum in Niš. The analysed vessels (**Figure 4**) were selected based on their specific forms and decoration. Besides in-situ measurements, the team applied an analytical procedure to determine the elemental composition of the pottery using a portable EDXRF spectrometer applied to the vessel body. In contrast to the analyses of previously prepared



Figure 4. Analysis of the vessels from the Velika Humska Čuka site using the EDXRF spectrometer in the depot of the National Museum, Niš (photo from the archive of the project).

sherds, this analysis was conducted on the existing damage of the vessel, by selecting the most suitable spots. Additionally, clay samples collected from two different locations in the vicinity of Velika Humska Čuka were analysed. Based on the analyses of the elemental composition of both the reconstructed vessels and clay samples (detected chemical elements are Si, K, Ca, Ti, Mn, Fe, Rb, Sr, Y, and Zr), a high degree of similarity has been determined (more than 90 per cent according to the hierarchical cluster method). Hence, it can be concluded with a high probability that the vessels were made from local raw clay. The determination of local production includes the analyses of pigments used for the decoration of ceramic vessels. The most interesting example is the motif of a “dancer” painted with red pigment. The EDXRF spectrometric technique determined that cinnabar was used for painting, which is usually rarely used for the decoration of ceramic vessels. By determining the presence of characteristic

trace elements in pigments, the origin of the raw material can be determined as well. The analyses indicated the presence of chrome (Cr), which is characteristic of cinnabar ore at Avala Mountain (Mladenović *et al.* 2023). Besides Avala Mountain, there are several cinnabar deposits that lie in the proximity of the site, such as the area between Breznica and Veliki Trnovac on the slopes of Kozarnik Mountain north of Bujanovac, and deposits in the vicinity of Gornji Milanovac on the slopes of Suvobor Mountain, near the village of Ozrem (Vukanović *i dr.* 1977: 42–44; Filipović *i dr.* 1978: 55–56). Therefore, the local origin of cinnabar pigment for the “dancer” motif can be speculated once further analyses are conducted on the local cinnabar deposits. On the other hand, if the origin of cinnabar for the “dancer” motif from the site of Velika Humska Čuka is confirmed to be Avala Mountain, there is a potential to provide new interpretations on the possible procurement of cinnabar from distant locations.



Figure 5. Use-wear analysis of the sword using the Leica EZ4 HD Digital Stereo Microscope (photo from the archive of the project).

A NEW INSIGHT INTO ARMS AND FASHION

One of the particularly interesting artifacts for the results of the project is a new find of an exceptionally rare type of bronze sword with a fully cast oval handle and three parallel grooves (the so-called Dreiwulstschwerter type) (Миладиновић, Булатовић и Филиповић 2023)¹. The sword underwent X-ray imaging and XRF analyses at the Vinča Institute of Nuclear Sciences, samples for copper and tin isotopic analyses in the USA were collected, and the blade also underwent use-wear analysis (**Figure 5**). The preliminary XRF analyses indicated that the sword has the purest bronze alloy compared to other artifacts analysed within THE FLOW project (Cu - 90.93%, Sn - 8.26%, Total - 99.19%). Furthermore, it should be highlighted that this example represents the first find

of this type south of the Sava and Danube rivers, dated to a relatively short period between 1200 and 1100 BCE (Ha A1 period). Certainly, the territory of origin of this object lies north of the Alps, and it was brought to the Central Balkans during the large-scale shifts and transformations in the Danube region and the Balkans during the transitional period (Ha A1).

Elemental analyses were also conducted on one of the fresh samples discovered at the site of Velika Humska Čuka near Niš during the 2022 excavation campaign. The samples, in fact, represent a hoard of bronze jewellery comprised of 22 pieces – 10 pieces of spirally twisted bronze wire (saltaleone), 10 bronze circular pendants with a knob in the middle, a bronze pin, and a thin bent bronze band. Several pieces from the hoard were analysed for chemical composition by a portable XRF spectrometer at the Vinča Institute. The analyses have shown that almost all of the analysed pieces have a similar chemical composition, based on tin-bronze, possibly made from the same

¹ The find is exhibited in the National Museum of Kruševac.



Figure 6. THE FLOW at the 65th International Fair of Technics and Technical Achievements, in Belgrade (photo from the archive of the project).

source of copper. Further insight into the chemical composition of the samples indicated that the pendants from this set of jewellery possibly originate from the same cast and workshop.

TOWARDS BETTER COMPREHENSION AND VISIBILITY OF RESULTS

Following the installation of the portable XRD instrument by the authorized service and the accompanying training, the team of the Vinča Institute started using the equipment. The development of analytical procedures was accompanied by the creation of a manual for the portable XRD spectrometer. Besides being a translation of the original manual, it contains other parameters significant for handling the device, analytical procedures, and for the interpretation of results, all considered important for further use by the team of authors from the Vinča Institute. With such experience, a planned training session was held for colleagues from the Institute of Archaeology in Belgrade. Colleagues were presented with the modes and possibilities of the instrument, all aspects of the analytical procedures, the methods by

which those analyses can be applied to cultural heritage, and the possible outcomes and results. THE FLOW project includes the processing of a large number of objects made of different materials through various analytical techniques, which will inevitably generate a large amount of different data and results. In line with that, a database is being created, enabling the availability and easily searchable access to all data, in order to provide better connections between the generated results. It will be the first open-access database in the region that unifies archaeological data and data acquired through techniques applied in natural sciences.

At the request of the Ministry of Science, Technological Development and Innovation, researchers from the Institute of Archaeology and members of THE FLOW project participated at the 65th International Fair of Technics and Technical Achievements, held in Belgrade between the 17th and the 19th of May (**Figure 6**). Team members introduced visitors to project details and demonstrated various instrumental techniques applied in provenance analyses of pottery and metal artifacts. The demonstration included a stand with different instruments (pXRF, XRF, FTIR) and a

background film with the achieved results and planned project dynamics.

At the end of 2022, one of the team members was invited to the International Scientific Conference – 75th Jubilee of the Institute of Art History and Archaeology of the Ss. Cyril and Methodius University in Skopje, and presented a new hoard of bronze jewellery from the vicinity of Požarevac, whose inventory indicates possible influences and imports in the Braničevo region (Filipović and Jacanović 2022). Further data will be available following the analysis of samples that have been sent to the laboratory.

Within the Annual Assembly of the Serbian Archaeological Society, an international assembly, members of THE FLOW project presented two reports that included the results of the project, such as physical and chemical analyses of bronze artifacts and questions about their origin and distribution. At the annual presentation within the Institute of Archaeology, held traditionally at Viminacium, the members of THE FLOW project presented two additional reports. One of the reports detailed the latest finds from the systematic archaeological excavations at the site of Velika Humska Čuka near Niš. Specifically, the report was based on the typo-chronological analysis of bronze finds, which will undergo isotopic and material analyses. THE FLOW project, all of its aspects, from administration and techniques to scientific results, were presented separately to all of the employees and guests of the Institute of Archaeology.

In the course of the second quaternary period, an opportunity was taken to participate in international training in the application of non-destructive radiographic methods on cultural heritage (Training Course on Radiography for Cultural Heritage Preservation, Valetta, Malta, 13-17.06.2022.) (Zammit and Gambin 2023: 34–35). The participation in training was completely funded by the International Atomic Energy Agency (IAEA) in Vienna. The training resulted in additional knowledge that can be applied to the project. Details of THE FLOW project were given during the presentation part of the training, dealing with the state of application of the aforementioned techniques in different countries.

The paper “The comparison of the multivariate techniques applied in the EDXRF provenance

study of the archaeological ceramic”, with the first results of the pottery analyses within THE FLOW project, was presented at the *International European Conference on X-Ray Spectrometry - EXRS2022*, held between the 27th of June and the 1st of July in Brugges, Belgium.² The goal of the paper was to determine the best approach for dealing with a large number of pottery samples and to suggest the most efficient method for the processing of the acquired analytical results. The 8th *Balkan Symposium on Archaeometry*, held in Belgrade between the 3rd and the 6th of October 2022, hosted a special event for the presentation of multidisciplinary projects financed by the Science Fund of the Republic of Serbia. The conference itself has significant importance for the territory of the Balkans and, therefore, the organisers created a special event in order to present examples of good practice in local science. Conference visitors were introduced to project goals and expected results. Within the same conference, the team of THE FLOW project presented the results of pigment analyses under the title “Preliminary investigation of the cinnabar origin and use on archaeological finds from an Early Metal Age site in north-western Serbia” (Gajić-Kvaščev *et al.* 2022).

At *TECHNART 2023 – An International Conference on Analytical Techniques in Art and Cultural Heritage*, held in Lisbon between the 7th and the 12th of May 2023, a paper titled “The newest metal findings from the Early Eneolithic house in South-eastern Serbia” was presented (Gajić-Kvaščev, Andrić and Bulatović 2023).

In the course of August 2023, several team members participated at the 29th *EAA Annual Meeting*, which was held in Belfast, Northern Ireland (**Figure 7**). The project presented the results of provenance analyses of four selected Early Eneolithic vessels from the site of Velika Humska Čuka, within a session that was focused on local production and local resources during prehistory (Mladenović *et al.* 2023). The lavishly decorated vessels, all typologically different, originate from an Early Eneolithic house dated to the mid-5th millennium BCE. The elemental composition of the vessels was compared with samples from three clay-pits in the vicinity of the site. The elemental

² More on conference: University of Antwerp 2022.



Figure 7. THE FLOW at the 29th European Association of Archaeologists meeting in Belfast, Northern Ireland (photo from the archive of the project).

composition of both the vessels and the clay pits was determined using an EDXRF spectrometer and the level of elemental similarity between the pots and the clay samples was quantified by hierarchical cluster analyses (HCA). The results have indicated that the vessels originated from one of the clay pits (clay sample No. 1), and that the vessels were made on-site using locally available raw materials.

Within the last year, members of THE FLOW project have published two articles: in one international journal and one high-ranking national journal, which partially or wholly represent the results of the project. The first article “Paulje, mound XI (mound K): new absolute dates and provenience of the earliest amber finds in Serbia”, was published in the *Contributions of the Institute of Archaeology in Zagreb*, Vol. 40/1, by the PI of the project and leader of WP 2, with experts from Poland, USA and Serbia (Cwaliński *et al.* 2023). The paper deals with the latest spectrometric analyses that indicate the origin of ancient amber (**Figure 8**) (Cwaliński *et al.* 2023: 88, fig. 6) found within the richest Late Bronze Age grave in Serbia (Paulje necropolis near Loznica). Besides the interest-

ing results and extensive discussion on trade, contacts, and origin of certain objects recorded at the necropolis, the paper provided the foundation for new scientific contacts with experts from the Institute of Archaeology, the University of Gdańsk in Poland, and the reputable Vassar College in USA. The Institute of Archaeology in Belgrade had no previous collaboration with the aforementioned institutions. The second article “The FLOW project – a contribution to the study of the cultural transmission of the Central Balkan communities and the neighbouring regions in later prehistory”, was published in a high-ranking national journal, *Archaeology and Science*, Vol. 18 (Bulatović *et al.* 2022). The paper presents the research ideas behind the project, as well as the basic theoretical and methodological perspectives of the research, which include a multidisciplinary approach based on analytical techniques of the natural sciences, such as physics and chemistry. The final goals of the project are to precisely determine the origin of samples and raw materials, create a spatio-temporal model with new absolute dates, and create a specific SQL database, in order to properly interpret the long-distance connections and population



Figure 8. The analysed amber from the central grave of Mound K at the Paulje necropolis (after: Палавестра и Крстић 2006).

networks in the Central Balkans during the Copper and Bronze Age.

During the final quarter of the first year of the project, team members submitted a paper to the *international journal Starinar* (M23). The paper titled: “Set of bronze jewellery from the site of Velika Humska Čuka near Niš, SE Serbia. A contribution to the study of interactions between Bronze Age communities of Central Europe and the Central Balkans” deals with a specific set of bronze finds that were discovered at the site of Velika Humska Čuka near Niš during the 2022 excavation campaign (Bulatović *et al.* 2023: in print). Aside from the results of the elemental analyses that were conducted at the Vinča Institute and presented in this paper, the paper also highlights the importance of long-distance connections in the transformation of Bronze Age communities in the Central Balkans.

CONCLUSION

Midway through the project, the team was able to observe that the research is progressing in the correct direction. Already, the preliminary results are in line with the presumption of the importance of long-distance connections in the transformation of Bronze Age communities in the Central Balkans. Confirmations have been found in the

new absolute dates and results of provenience analyses of the earliest amber finds in Serbia, as well as the origin of the newly found bronze sword. Additionally, the significance of local raw materials and traditions in manufacture has been recognised thanks to the analyses of jewellery and pottery samples.

The upcoming project activities will aim to consolidate the already established methodological procedures and, most importantly, to interpret the awaited outcomes and to integrate them into explanatory models of complex processes in societies in the later prehistory.

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REZIME

NA POLA PUTA PROJEKTA THE FLOW – METODE, PRAKSE I PRVI REZULTATI

KLJUČNE REČI: KERAMIKA, BAKAR, BRONZA, OPSIDIJAN, POREKLO SIROVINA, IZOTOPSKE ANALIZE, APSOLUTNO DATOVANJE.

U radu su sumirani rezultati postignuti tokom prvih osamnaest meseci trajanja projekta THE FLOW (*Interactions-Transmission-Transformation: Long-distance Connections in Copper and Bronze Age of Central Balkans*), koji zajednički realizuju Arheološki institute Beograd, Institut

za nuklearne nauke „Vinča“ i Filozofski fakultet Univerziteta u Beogradu.

Projektni tim je posetio dvanaest muzeja na teritoriji Centralne Srbije, prešavši više od 5.000 km. Sakupljeno je više od 400 uzoraka keramike sa 67 arheoloških lokaliteta za analizu provenijencije, termoluminiscenciju i optički stimulisanu luminiscenciju. Prikupljeni su i uzorci više od 64 bakarna i 150 bronzanih artefakata, kao i više od 25 uzoraka iz pozajmišta gline i rudnih ležišta. Ukupno je prikupljeno 30 uzoraka predmeta od opsidijana. Nakon prikupljanja uzoraka, sprovedene su procedure nabavke usluga za AMS i TL/OSL datovanje. Započete su i procedure za izvođenje izotopskih analiza u svrhu dobijanja informacija o poreklu bakra i kalaja. Ugovori za TL/OSL analize su potpisani sa Univerzitetskim institutom geologije „Isidro Parga Pondal“ iz La Korunje (Španija), a rad na AMS analizama je ugovoren sa laboratorijom „Isotoptech Zrt.“ iz Debrecina (Mađarska) i Rutgers Univerzitetom u Nju Džersiju (SAD).

Nakon instaliranja prenosnog XRD aparata i obavljanja prateće obuke, tim Instituta za nuklearne nauke „Vinča“ je pristupio primeni opreme. Razvoj analitičkih postupaka praćen je izradom *Priručnika za prenosni XRD spektrometar*. Tokom 2022. godine je timu bila omogućena i međunarodna obuka u primeni nedestruktivnih radiografskih metoda na kulturnom nasleđu (*Regional Training Course on Radiographi for Cultural Heritage Preservation*) u La Valeti (Malta).

Laboratorijska istraživanja u okviru projekta su do sada donela mnoge važne rezultate, među kojima su oni o poreklu sirovina za izradu analiziranih keramičkih posuda, kao i pigmenata upotrebljivanih za njihovu dekoraciju. Dobijeni su i izuzetno značajni podaci o sastavu analiziranih predmeta od metala – oružja i nakita, na osnovu kojih su doneti preliminarni zaključci o tehnologiji njihove izrade, odnosno pripadnosti određenom regionu ili radionici. Buduće projektne aktivnosti biće usmerene ka konsolidaciji već uspostavljenih metodoloških postupaka, kao i interpretaciji rezultata i njihovoj integraciji u modele kojima se objašnjavaju složeni procesi u društvima u mlađoj praistoriji.

Članovi projektnog tima su tokom dosadašnjeg trajanja projekta objavili dva rada u visoko rangiranim međunarodnim časopisima. Projekat i njegovi dosadašnji rezultati predstavljeni su na 65.

Međunarodnom sajmu tehnike i tehničkih dostignuća u Beogradu, *XLVI godišnjem skupu Srpskog arheološkog društva* u Somboru i godišnjem skupu Arheološkog instituta u Viminacijumu, svi u 2023. godini, kao i na više međunarodnih naučnih skupova: u Dojranu (Severna Makedonija), Brižu (Belgija), Lisabonu (Portugal), Belfastu (Severna Irska) i Beogradu, tokom 2022. i 2023. godine. Takođe, projekat THE FLOW je tokom svojih aktivnosti inicirao stvaranje mreže naučne saradnje između više institucija, što se može nastaviti kroz buduće zajedničke projekte.

* * *

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