KNJIGA POVZETKOV

1. Mednarodna konferenca mladih dediščinskih strokovnjakov

Koper, 10. april, 2025

Fakulteta za humanistične študije, Univerza na Primorskem

Heritici

Mladi strokovnjaki za dediščinsko znanost Slovenije

BOOK OF ABSTRACTS

1st International Conference of Young Researchers in Heritage Science

Koper, April 10, 2025

Faculty of Humanities, University of Primorska

HeriSci
Young Reaserchers in Heritage Science Slovenia

1st International Conference of Young Researchers in Heritage Science
HERI SCI

Book of Abstracts

April 10, 2025

University of Primorska

Koper, Slovenia

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Knjiga povzetkov

Organizator: *Mladi strokovnjaki za dediščinsko znanost Slovenije in Univerza na Primorskem, Fakulteta za humanistične študije*

Uredniki: Herceg Ane Marie, Brina Zagorc, Anžur Lana Nastja, Kristina Klemenčič

Založnik: Univerza v Ljubljani, Fakulteta za kemijo in kemijsko tehnologijo

April 2025

Ljubljana

1st International Conference of Young Researchers in Heritage Science HERI SCI

Book of abstracts

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Prof. dr. Irena Cigić Kralj, Faculty of Chemistry and Chemical Technology, University of Ljubljana (UL)

Program konference

1. mednarodna konferenca mladih dediščinskih strokovnjakov HERI SCI

Datum: 10. april 2025, od 8.00 do 18.30

Lokacija: Titov trg 4, Koper

Soorganizator: Fakulteta za humanistične študije, Univerza na Primorskem, Koper

8.00–9.00: Prijava udeležencev, kava

9.00–9.10: Uvodni pozdrav, predstavitev HERI SCI

Predsednica HERI SCI, Lana Nastja Anžur

9.10–9.15: Uvodni pozdrav

Prorektor za znanstvene raziskave, prof. dr. Štefko Miklavič

9.15–9.20: Pozdrav; Evropsko združenje študentov kulturne dediščine ESACH

Predsednica ESACH, Sorina Neascu, Glavna tajnica, Jasna Popović

9.20–9.30: Pozdrav; E-RIHS, evropska raziskovalna infrastruktura za znanost o dediščini

dr. Matija Strlič, Univerza v Ljubljani, predsednik programskega odbora Slovenskega nacionalnega vozlišča E-RIHS in dr. Giovanni Pescarmona, Consiglio Nazionale delle Ricerche – Nacionalni Inštitut za dediščinsko znanost, Italija

9.30–11.30:

Nagovor častnega gosta, dr. Aleša Musarja k otvoritvi okrogle mize

Okrogla miza »Prispevek kulturne dediščine k ciljem trajnostnega razvoja«

Gostje:

1. *dr. Aleš Musar, Urad predsednice Republike Slovenije, dr. Nataše Pirc Musar*
2. *g. Janez Kastelic, direktor Parka naravnega rezervata Ljubljansko barje*
3. *doc. dr. Zrinka Mileusnić, Univerza na Primorskem*
4. *prof. dr. Matija Strlič, Univerza v Ljubljani*
5. *ga. Dubravka Kalin, generalna direktorica Direktorata za turizem, Ministrstvo za gospodarstvo, turizem in šport*

Moderatorka: Lana Nastja Anžur

11.30–12.30 Brunch

Prvi sklop predstavitev 12.30–15.00

12.30–12.40 Karakterizacija vonja staroegipčanskih mumificiranih teles s kemično in senzorično analizo

Emma Paolin

12.40–12.50 Bioarheologija kot del znanosti o dediščini: pomen preučevanja preteklosti skozi interdisciplinarne pristope

dr. Brina Zagorc

13.00–13.10 BArCH-Wood: Spremljanje občutljivosti arheološkega lesa na spremembe tal zaradi podnebnih vplivov

Zvonka Janežič, Nejc Golob

13.10–13.20 Neinvazivne metode za identifikacijo in odkrivanje umetnih kamnitih blokov zgodovinskih stavb v Sieni (Italija)

Gioele Rossi

13.20–13.30 Digitalno ohranjanje in virtualna rekonstrukcija ohridske arheološke in kulturne dediščine

Ivan Malezanov

13.30–13.40 Zini kot živa dediščina: alternativne perspektive v kulturnem turizmu

Jaka Godejša, Maša Bogojević

13.40–13.50 Razprava

13.50–14.00 Razumevanje izobraževanja o kulturni dediščini: zaznave, interesi in učne izkušnje

Tijana Marković, Darya Herman, Andrea Petrović, Stefan Pemper, Siniša Sekulić, Sonia Covolo Ciuch

14.00–14.10 HeriQuest: percepcija in vrednotenje kulturne dediščine

Lana Nastja Anžur

14.10–14.20 Trebče 2.0 – iz preteklosti v sedanjost za prihodnost

Sonia Covolo Ciuch

14.20–14.30 Ponovno povezane tovarne. Povezovanje industrijske dediščine z ozaveščenostjo javnosti

Ramona Costea

14.30–14.40 Razmišljanje o človeštvu skozi artefakte: izobraževanje o bližini in dediščini v starodavnih zahodnoazijskih podobah

Kayssa Mavrides

14.40–14.50 Eksperimentalna arheologija: vpogled v kulturno dediščino skozi čas, povezovanje preteklosti s sedanjostjo in prihodnostjo

Anđelka Putica

14.50–15.00 Razprava

15.00–15.40 ODMOR

Drugi sklop predstavitev 15.40–18.30

15.40–15.50 Čiščenje z geli na medaljonu Poletje iz cikla štirih letnih časov

Kristina Klemenčič

15.50–16.00 Potencial glasbe kot medija pri ohranjanju dediščine

Matej Berlot

16.00–16.10 Raziskava v Moderni galeriji: Katere plastične materiale vsebujejo muzejske zbirke?

Špela Pok

16.10–16.20 Med barvo in sijajem: XRF analiza slikane in glazirane lončenine iz srednjeveškega trga Gutenwerd

Katja Špec

16.20–16.30 Ko stele ponovno pridobijo barve: prispevek hiperspektralnega slikanja k identifikaciji in kartiranju pigmentov na francoskih stelah (Vaucluse).

Le Turnier Marianne

16.30–16.40 Kulturne relikvije iz puščave v srce imperija

Polona Brumen

16.40–16.50 Razprava

16.50–17.00 Nesnovna dediščina čebelarstva in uporaba umetne inteligence za avtomatizacijo pelodne analize medu

Martin Jurkovič

17.00–17.10 Ise Jingū kot eblematski primer japonske kulturne dediščine in turistična destinacija

Aljaž Mesner

17.10–17.20 Družbena omrežja kot vektorji za promocijo nesnovne kulturne dediščine Maroka: vprašanja in perspektive

Meryem Baba

17.20–17.30 Vernakularna dediščina na izpraznjenih območjih. Grožnje in dejavniki Odpornosti

Eva Tortajada Montalvá

17.30–17.40 Trajnostni pristopi h konserviranju-restavriranju

Irina Pozdorovkina

17.40–17.50 Analiza lesene konstrukcije poškodovane v požaru – lesena kašča Zaprice Kamnik

Luka Kopač

17.50–18.00 Topografija in katalogizacija poznoantičnih pokopov v Kopru

Tejka Lavrič

18.20–18.30 Zaključni nagovor dr. Brine Zagorc, podpredsednice HERI SCI

18.30– Družabni večer po konferenci, Loggia Caffe

Conference program

1st International Conference of Young Researchers in Heritage Science HERI SCI

Date: April 10, 2025, from 8:00 a.m. to 6:00 p.m.

Location: Titov trg 4, Koper

Co-organizer: Faculty of Humanities, University of Primorska, Koper

8.00–9.00: Registration of participants, coffee

9.00–9.10: Introductory greeting, presentation of HERI SCI

President of the HERI SCI, Lana Nastja Anžur

9.10–9.15: Greeting;

Vice-Rector for Scientific Research, Štefko Miklavič, PhD

9.15–9.20: Greeting; European Association for Students in Cultural Heritage ESACH

President of ESACH, Sorina Neascu; Secretary General, Jasna Popović

9.20–9.30: Greeting: E-RIHS, the European Research Infrastructure for Heritage Science

Matija Strlič, PhD, University of Ljubljana, chair of the steering committee of Slovenian National Node of E-RIHS and Giovanni Pescarmona, PhD, Consiglio Nazionale delle Ricerche – National Institute for Heritage Science, Italy

9.30–11.30: Roundtable "Contribution of Cultural Heritage towards Sustainable Development Goals"

Opening address by the honorary guest, Aleš Musar, PhD

Guests:

1. *Aleš Musar, PhD, Office of the President of the Republic of Slovenia*
2. *Janez Kastelic, director of the Ljubljana Marshes Natural Reserve Park*
3. *Zrinka Mileusnić, PhD, University of Primorska*
4. *Matija Strlič, PhD, University of Ljubljana*
5. *Dubravka Kalin, Director-General of the Directorate for Tourism, Ministry of Economy, Tourism and Sport*

Moderator: Lana Nastja Anžur

11.30–12.30 Brunch

First Panel of Presentations 12.30–15.00

12.30–12.40 Characterization of the Scent of Ancient Egyptian Mummified Bodies Using Chemical and Sensory Analysis

Emma Paolin

12.40–12.50 Bioarchaeology as Part of Heritage Science: The Importance of Studying the Past Through Interdisciplinary Approaches

Brina Zagorc, PhD

13.00–13.10 BArCH-Wood: Monitoring the Sensitivity of Archaeological Wood to Soil Changes Due to Climate Impact

Zvonka Janežič, Nejc Golob

13.10–13.20 Non-Invasive Methods for Identification and Detection of Artificial Stone Blocks of Historical Buildings in Siena (Italy)

Gioele Rossi

13.20–13.30 Digital Preservation and Virtual Reconstruction of Ohrid's Archaeological and Cultural Heritage

Ivan Malezanov

13.30–13.40 Zines as Living Heritage: Alternative Perspectives in Cultural Tourism

Jaka Godejša, Maša Bogojević

13.40–13.50 Discussion

13.50–14.00 Understanding Cultural Heritage Education: Perceptions, Interests, and Learning Experiences

Tijana Marković, Darya Herman, Andrea Petrović, Stefan Pemper, Siniša Sekulić, Sonia Covolo Ciuch

14.00–14.10 HeriQuest: Perception and Valuation of Cultural Heritage

Lana Nastja Anžur

14.10–14.20 Trebče 2.0 – From the Past to the Present for the Future

Sonia Covolo Ciuch

14.20–14.30 Re-linked factories. Connecting Industrial Heritage with Public Awareness javnosti

Ramona Costea

14.30–14.40 Contemplating Humanity Through Artifacts: Proximity and Heritage Education in Ancient Western Asian Imagery

Kayssa Mavrides

14.40–14.50 Experimental Archaeology: Insights into Cultural Heritage Through Time, Connecting the Past with the Present and Future

Anđelka Putica

14.50–15.00 Discussion
15.00–15.40 BREAK

Second Panel of Presentations 15.40–18.30

15.40–15.50 Gel Cleaning on the Medallion Summer from the Cycle of Four Seasons

Kristina Klemenčič

15.50–16.00 The Potential of Music as a Medium for Preserving Heritage

Matej Berlot

16.00–16.10 Research in the Museum of Modern Art: What Plastic Materials Do Museum Collections Contain?

Špela Pok

16.10–16.20 Between Color and Shine: XRF Analysis of Painted and Glazed Pottery from the Medieval Market Town of Gutenwerd

Katja Špec

16.20–16.30 When Stelae Regain Their Colors: The Contribution of Hyperspectral Imaging to the Identification and Mapping of Pigments on French Stelae (Vaucluse)

Le Turnier Marianne

16.30–16.40 Cultural Relics from the Desert to the Heart of the Empire

Polona Brumen

16.40–16.50 Discussion

16.50–17.00 The Intangible Heritage of Beekeeping and the Use of Artificial Intelligence for Automating Pollen Analysis of Honey

Martin Jurkovič

17.00–17.10 Ise Jingū as an Emblematic Example of Japanese Cultural Heritage and a Tourist Destination

Aljaž Mesner

17.10–17.20 Social Networks as Vectors for Promoting Morocco's Intangible Cultural Heritage: Issues and Prospects

Meryem Baba

17.20–17.30 Vernacular Heritage in Depopulated Territories. Threats and Resilience Factors

Eva Tortajada Montalvá

17.30–17.40 Sustainable Approaches to Conservation-Restoration

Irina Pozdorovkina

17.40–17.50 Analysis of a Wooden Structure Damaged by Fire – The Wooden Granary Zaprice Kamnik

Luka Kopač

17.50–18.00 Topography and Cataloging of Late Antique Burials in Koper

Tejka Lavrič

18.20–18.30 Closing remarks by Brina Zagorc, PhD; Vice President of HERI SCI

18.30 – Social evening after the conference, Loggia Caffe


Heritici
Mladi strokovnjaki za dediščinsko znanost Slovenije

Vsebina

Contents

Uvod

Dediščinska znanost je interdisciplinarno področje na stičišču humanistike, naravoslovja in inženirstva, ki je posvečeno preučevanju, varovanju in trajnostni rabi kulturne in naravne dediščine. Z združevanjem različnih perspektiv in metodologij poglablja naše razumevanje dediščine ter zagotavlja njeno ohranitev in pomen za sedanje in prihodnje generacije.

V duhu tega dinamičnega področja z veseljem predstavljamo prispevke 1. mednarodne konference mladih dediščinskih strokovnjakov, ki jo organizira HERI SCI – Mladi strokovnjaki za dediščinsko znanost Slovenije, v sodelovanju z Univerzo na Primorskem. Dogodek predstavlja pomemben mejnik v podpori in promociji dela raziskovalcev na začetku kariere, ki delujejo na različnih področjih, a jim je skupno, da njihove raziskave vključujejo preučevanje dediščine. HERI SCI deluje pod okriljem E-RIHS Slovenija, nacionalnega vozlišča Evropske raziskovalne infrastrukture za znanost o dediščini, ki spodbuja interdisciplinarno sodelovanje in omogoča dostop do vrhunske raziskovalne infrastrukture.

Konferenca, ki bo potekala 10. aprila 2025 na Univerzi na Primorskem, bo združila mlade raziskovalce, študente in strokovnjake, da si izmenjajo ideje, predstavijo raziskovalne dosežke in vzpostavijo stik z vodilnimi strokovnjaki na tem področju. Program, ki vključuje 25 predstavitev in okroglo mizo, osvetljuje živahno raziskovalno dogajanje na področju znanosti o dediščini v Sloveniji in širše.

Glavni cilj konference je okrepiti mrežo mladih, ki jih zanima dediščinska znanost, spodbuditi interdisciplinarni dialog in podpreti prihodnja sodelovanja.

Iskreno se zahvaljujemo vsem sodelujočim, vključno s soprogom Predsednice Republike Slovenije, dr. Alešem Musarjem, Evropsko raziskovalno infrastrukturo za znanost o dediščini (E-RIHS), slovenskim nacionalnim vozliščem E-RIHS, Univerzo na Primorskem ter Evropskim združenjem študentov za kulturno dediščino (ESACH), za njihovo podporo in dragocene usmeritve. Prepričani smo, da bo ta prva konferenca odprla pot za nadaljnja raziskovalna povezovanja in navdihnila nove ideje, spodbudila aktivnosti na področju združevanja dediščine in trajnostnega razvoja in prispevala k razvoju močne in povezane skupnosti mladih raziskovalcev na področju dediščinske znanosti.

Organizacijski odbor

Introduction

Heritage science is an interdisciplinary field at the crossroads of the humanities, sciences, and engineering, dedicated to the study, conservation, and sustainable use of cultural and natural heritage. By combining diverse perspectives and methodologies, it deepens our understanding of heritage and ensures its preservation and relevance for current and future generations.

In the spirit of this dynamic field, we are proud to present the 1st International Conference of Young Researchers in Heritage Science, organized by HERI SCI – Young Researchers in Heritage Science Slovenia in partnership with University of Primorska. This event represents a significant milestone in supporting and promoting the work of early-career researchers across disciplines engaged in heritage science. HERI SCI operates under the auspices of E-RIHS Slovenia, the national node of the European Research Infrastructure for Heritage Science, which fosters cross-disciplinary collaboration and provides access to cutting-edge research infrastructures.

The conference, held on the 10th of April 2025, at the University of Primorska, brings together young researchers, students, and professionals to exchange ideas, showcase research, and engage with leading experts in the field. With a rich programme featuring 25 oral presentations, and a roundtable, the event highlights the vibrant research landscape in heritage science within Slovenia and beyond.

A key objective of this conference is to strengthen the network of young people interested in heritage science, to encourage interdisciplinary dialogue, and promote future collaborations.

We extend our sincere thanks to all contributors, including the First gentleman of the Republic of Slovenia, dr. Aleš Musar, European Infrastructure for Heritage Science (E-RIHS), Slovenian National Node of E-RIHS, University of Primorska and European Association of Students in Cultural Heritage (ESACH) for their support and guidance. We are confident that this inaugural conference will inspire new ideas, spark meaningful connections, and contribute to the growth of a strong and connected community of young heritage science researchers.

The Organizing Comittee


HerSci
Young Reaserchers in Heritage Science Slovenia

1 E-Rihs: Povezovanje dediščine z znanostjo

Giovanni Pescarmona[1]
[1] CNR ISPC (National Research Council – Italija, National Institute for Heritage Science)

Dediščinska znanost se razvija kot ključno in strateško področje za ohranjanje, interpretacijo in trajnostno upravljanje kulturne dediščine. Evropska raziskovalna infrastruktura za dediščinsko znanost (E-RIHS) ima ključno vlogo pri tej tranziciji, saj zagotavlja dostop do najsodobnejših tehnologij, interdisciplinarnega strokovnega znanja in inovativnih digitalnih orodij. E-RIHS s svojo porazdeljeno mrežo nacionalnih vozlišč in platform, kot so ARCHLAB, FIXLAB, MOLAB in razvijajoči se DIGILAB, raziskovalcem omogoča uporabo naprednih znanstvenih metodologij pri preučevanju predmetov in območij kulturne dediščine.

Študentom in mladim strokovnjakom na področju kulturne dediščine Heritage Science ponuja edinstveno priložnost za sodelovanje z najsodobnejšimi analitičnimi tehnikami, vrhunskimi tehnologijami in okviri odprte znanosti. Pobude za usposabljanje E-RIHS, ki so na voljo pod okriljem Heritage Science Academy – od doktorskih poletnih šol do praktičnih laboratorijskih izkušenj – so namenjene premostitvi vrzeli med akademsko sfero in uporabnimi raziskavami ter opremljanju naslednjih generacij študentov in raziskovalcev z dopolnilnimi znanji za obvladovanje hitro razvijajočega se strokovnega okolja.

S spodbujanjem sodelovanja med naravoslovnimi in humanističnimi vedami, E-RIHS spodbuja celosten pristop k ohranjanju dediščine in ustvarjanju znanja. Krepi inovacije na področju kulturne dediščine, pri čemer omogoča izkoriščanje transformativnega potenciala tehničnih pristopov in interdisciplinarnih spretnosti za reševanje problemov ter se usklajuje z evropskimi prednostnimi nalogami na področju digitalne preobrazbe in trajnostnega upravljanja dediščine, ki so potrebne za izboljšanje zaposljivosti. V tem prispevku je raziskan vpliv usposabljanja na področju znanosti o dediščini na poklicni razvoj na področju kulturne dediščine, pri čemer so preučene štiri omogočitvene platforme E-RIHS in njihove funkcije. Poleg tega bo v predstavitvi poudarjena vloga E-RIHS-a pri oblikovanju prihodnjih strokovnjakov, ki bodo sposobni z znanstvenim raziskovanjem in tehnološkim napredkom reševati kompleksne izzive na področju raziskovanja in ohranjanja dediščine.

Literatura

Vania Virgili, »Connecting Heritage to Science«, prispevek na konferenci, Univerza v Ljubljani, 6. marec 2025.

E-Rihs: Connecting Heritage to Science

Giovanni Pescarmona[1]
[1] CNR ISPC (National Research Council – Italy, National Institute for Heritage Science)

Heritage Science is emerging as a pivotal and strategic field for the preservation, interpretation, and sustainable management of cultural heritage. The European Research Infrastructure for Heritage Science (E-RIHS) plays a crucial role in this transformation by providing access to cutting-edge facilities, interdisciplinary expertise, and innovative digital tools. Through its distributed network of National Nodes and platforms such as ARCHLAB, FIXLAB, MOLAB, and the developing DIGILAB, E-RIHS enables researchers to apply advanced scientific methodologies to the study of cultural heritage objects and sites.

For students and young professionals in the cultural heritage sector, Heritage Science offers an unprecedented opportunity to engage with state-of-the-art analytical techniques, cutting-edge technologies and open science frameworks. The E-RIHS training initiatives offered under the umbrella of Heritage Science Academy—ranging from doctoral summer schools to hands-on laboratory experiences—aim to bridging the gap between academia and applied research, equipping next generation students and researchers with the complementary skills to navigate a rapidly evolving professional landscape.

By fostering collaboration between hard sciences and humanities, E-RIHS promotes an integrated approach to heritage conservation and knowledge production. It enhances innovation in the cultural heritage field, unlocking the transformative potential of technical approaches and interdisciplinary problem-solving skills, aligning with European priorities in digital transformation and sustainable heritage management needed to improve employability. This paper explores the impact of Heritage Science training on career development in cultural heritage, exploring the four E-RIHS enabling platforms and their functions. Moreover, this presentation will highlight the role of E-RIHS in shaping future professionals capable of addressing complex heritage research and conservation challenges through scientific inquiry and technological advancements.

References

Vania Virgili, "*Connecting Heritage to Science",* conference paper, University of Ljubljana, 6 March 2025.

2 Potencial glasbe kot medija pri ohranjanju dediščine

Matej Berlot[1]
[1] Universität für Musik und Darstellende Kunst Wien, Fritz Kreisler Institut für Konzertfach Streichinstrumente, Gitarre und Harfe & Institut für Alte Musik, Avstrija

Dostopnost glasbe se je z razvojem interneta močno spremenila, s tem pa tudi vloga, ki jo igra v naših življenjih. Tako poslušalec kot izvajalec se soočata z edinstvenimi izzivi in priložnostmi, ki zahtevajo nov, spremenjen pogled na glasbo. V času vse večje povezanosti sveta in hitre globalizacije se meje med glasbenimi stili in kulturami na videz vse bolj zabrisujejo, hkrati pa imamo priložnost spoznavati glasbene svetove, ki nam poprej niso bili dostopni.

Glasba je medij zgodovine. Od neposrednih (etno)muzikoloških raziskav, klasične in popularne glasbe do ljubiteljskega povezovanja v folklorna društva nas v vsakdanu nezavedno spoznava z drobci dediščine. Rastoči trendi, ki v zadnjem času navdih vse bolj črpajo iz (lokalne) zgodovine vsakdanjega poslušalca izobražujejo – od uporabe ljudskih motivov in estetike, plesnih vzorcev ter uporabe avtentičnih instrumentov. Obujanje glasbene dediščine tako zahteva učinkovito interdisciplinarno sodelovanje: od terenskega zbiranja ljudskih motivov, uporabe likovnih del kot vir informacij iz prve roke o izvajanju in sprejemanju glasbe, do poglobljenega muzikološkega študija glasbenih del in nenazadnje glasbenika, specializiranega za izvedbo takšne glasbe. Sam raziskovalni proces se pogosto obrača k starejšim generacijam kot prvoročnemu viru informacij, umetnostnim zgodovinarjem in rokodelcem, ki nudijo praktični uvid v (iz)delovanje instrumentov.

Skozi celotno človeško zgodovino je glasba med drugim služila preprostemu preživljanju prostega časa. V zvočni zasičenosti našega vsakdana skrbno zasnovani kulturni dogodki nudijo priložnost za zbliževanje širše javnosti z dediščino. Programi, privlačni publiki, so vse pogosteje neposredno povezani z glasbenim izročilom, najsibo ljudskim ali umetnim; dogodek pa lahko sam, s svojim lokalnim in zgodovinskim kontekstom, seznani nič hudega sluteče poslušalce tudi z drugimi aspekti dediščine (od umetnosti in običajev do lingvistike in arhitekture …). Vključenost lokalnega prebivalstva (npr. pri organizaciji festivalov) tako ne le krepi identiteto skupnosti, povezano z njeno preteklostjo, temveč jo tudi povezuje ter ustvarja nove priložnosti za ohranjanje znanj in njihov prenos.

Zahvale
Zahvala za pomoč pri ustvarjanju gre profesorjem, predvsem prof. Andre Ferreira in prof. Stefan Gottfried, ki sta mi približala pristop k stari glasbi, prof. Alvaru Pierriju za delo na področju povezave klasične in ljudske glasbe ter prof. Elisabeth Probst iz Inštituta za muzikologijo.

The Potential of Music as a Medium for Preserving Heritage

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The accessibility of music has changed significantly with the development of the internet, along with the role it plays in our lives. Both listeners and performers face unique challenges and opportunities that require a new, adapted perspective on music. In an era of increasing global interconnectedness and rapid globalization, the boundaries between musical styles and cultures appear to be blurring. At the same time, we have the opportunity to explore musical worlds that were previously inaccessible to us.

Music is a medium of history. From direct (ethno)musicological research, classical and popular music, to amateur involvement in folk societies, it unconsciously introduces us to fragments of heritage in everyday life. Growing trends in recent times increasingly draw inspiration from (local) history, educating everyday listeners through the use of folk motifs and aesthetics, dance patterns, and authentic instruments. Reviving musical heritage thus requires effective interdisciplinary collaboration, ranging from field collection of folk motifs, the use of artistic works as firsthand sources on performance and musical reception, to in-depth musicological study of compositions, and, not least, musicians specialized in performing such music. The research process often turns to older generations as primary sources of information, as well as to art historians and craftsmen who provide practical insights into the (re)construction and function of instruments.

Throughout human history, music has, among other things, served as a simple way to pass the time. In the auditory saturation of our daily lives, carefully curated cultural events offer an opportunity to bring the wider public closer to heritage. Programs that attract audiences are increasingly directly linked to musical traditions, whether folk or art music. The event itself, through its local and historical context, can introduce unsuspecting listeners to other aspects of heritage, including art, customs, linguistics, and architecture. The involvement of the local population (e.g., in organizing festivals) not only strengthens the community's identity in relation to its past but also fosters connections and creates new opportunities for preserving and transmitting knowledge.

Acknowledgments
I would like to thank my professors for their help in shaping this work, especially Prof. Andre Ferreira and Prof. Stefan Gottfried, who introduced me to the approach to early music; Prof. Alvaro Pierri for his work on the connection between classical and folk music; and Prof. Elisabeth Probst from the Institute of Musicology.

3 Razmišljanje o človeštvu skozi artefakte: izobraževanje o bližini in dediščini v starodavnih zahodnoazijskih podobah

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Kritično branje vizualnih podob, razvito skupaj s teorijami kritične pedagogike v zgodnjih šestdesetih letih prejšnjega stoletja, ostaja pomembno orodje vizualne analize. Edmund Burke Feldman, ključna osebnost likovne vzgoje, je pomembno prispeval k likovni kritiki in interpretaciji podob ter s tem vplival na šolsko in muzejsko okolje. Sčasoma je njegov pristop navdihnil izobraževalce po vsem svetu – od muzejskih pobud do skupnostnih programov.

Ta študija preučuje uporabnost Feldmanovega pristopa k branju podob pri komuniciranju arheologije Zahodne Azije, zlasti v univerzitetnih muzejih – vidik, ki v akademski literaturi še ni bil obravnavan. Od leta 2023 se ta tehnika preizkuša kot okvir za vključevanje nestrokovnega občinstva v razumevanje arheoloških artefaktov. Prispevek obravnava izzive in razširitve tega pristopa v arheološkem kontekstu ter poudarja vlogo posrednikov pri omogočanju dostopnosti in interpretacije. S povezovanjem vizualne pismenosti z arheološkim izobraževanjem raziskava razmišlja o potencialu branja podob kot mostu med artefakti in obiskovalci muzeja.

Ilustracija Tatiane Laurindo. / Illustration by Tatiana Laurindo.

Contemplating Humanity Through Artifacts: Proximity And Heritage Education in Ancient Western Asian Imagery

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The Critical Image Reading Performance, developed alongside critical pedagogy theories in the early 1960s, remains a relevant tool for visual analysis. Edmund Burke Feldman, a key figure in art education, significantly contributed to art criticism and image interpretation, influencing both school and museum settings. Over time, his approach has inspired educators worldwide—from museum initiatives to community-based programs.

This study examines the applicability of Feldman's image reading to the communication of the Archaeology of Western Asia, specifically within university museum settings—an aspect not previously explored in academic literature. Since 2023, the technique has been tested as a framework for engaging non-specialist audiences with archaeological artifacts. The paper discusses the challenges and expansions of this approach in an archaeological context, emphasizing the role of mediators in facilitating accessibility and interpretation. By integrating visual literacy with archaeological education, this research reflects on the potential of image reading as a bridge between artifacts and museum visitors.

4 BArCH-Wood: Spremljanje občutljivosti arheološkega lesa na spremembe tal zaradi podnebnih vplivov

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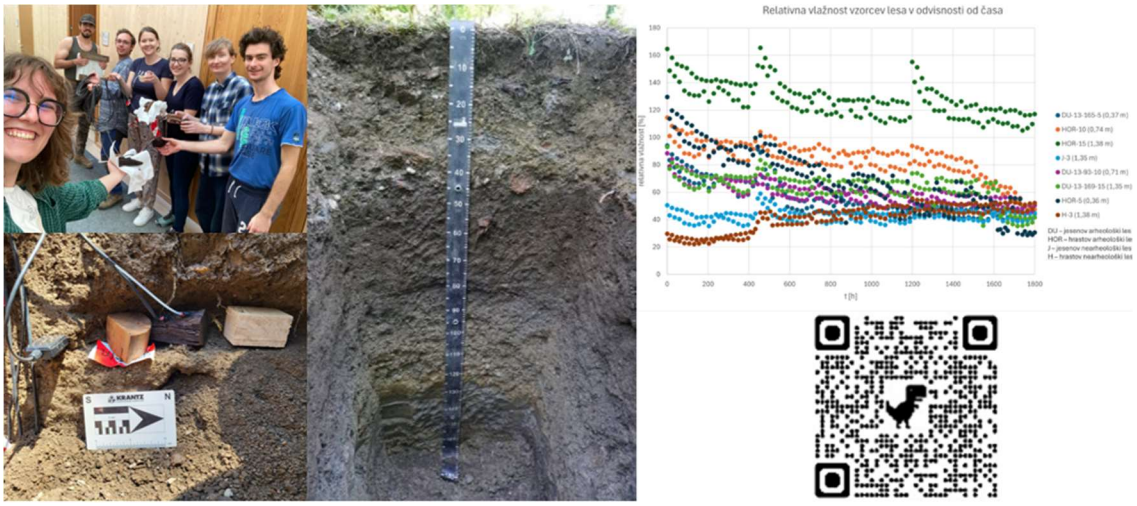
BArCH-Wood je interdisciplinarni projekt, ki združuje osem študentov in pet mentorjev z različnih področij (arheologije, kemije, lesarstva in agronomije-pedologije). Glavni cilj raziskovalnega projekta je bil preučiti vpliv podnebnih sprememb na razgradnjo arheološkega in recentnega lesa Ljubljanskega barja. Za simulacijo naravnih razmer smo na testnem območju v bližini Oddelka za lesarstvo opravili pedološki pregled tal in izkop pedološkega profila tehnogenih tal do globine 1,7 m. V izbranih petih talnih horizontih (A, I, II, III in V) smo na različnih globinah zakopali petnajst vzorcev arheološkega in recentnega lesa (hrasta in jesena), opremljenih z merilnimi senzorji za spremljanje vlažnosti in temperature v lesu ter tleh.

Meritve so potekale v 12-urnih intervalih med 13. junijem in 28. avgustom 2024. Pokazale so, da se temperatura in vlažnost tal spreminjata glede na vremenske razmere, pri čemer so bile razlike z večjo globino manj izrazite. Analiza vsebnosti vlage v lesu je razkrila, da arheološki les veže več vode, a jo izgublja hitreje kot recentni, kar nakazuje njegovo večjo ranljivost. Najugodnejši pogoji za ohranitev arheološkega lesa so bili v najglobljem sloju (V), kjer prevladujejo stalne, reduktimorfne razmere, podobne tistim na Barju.



Slika 1: Utrinki iz raziskovalnega dela na projektu BArCH-Wood. / Highlights from the BArCH-Wood research project.

Izsledki raziskav kažejo, da podnebne spremembe pospešujejo razgradnjo lesa (Anžur in sod., 2024). Rezultati projekta in razvita metodologija za spremljanje stanja arheološkega lesa v realnem času so ključni za razumevanje odnosa med lesom in tlemi. Prispevali bodo k načrtovanju ustreznih konservatorskih ukrepov in razpravi o novih pristopih za ohranjanje koliščarskih najdišč.

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BArCH-Wood: Monitoring the Vulnerability of Archaeological Wood to Climate-Induced Soil Changes

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BArCH-Wood is an interdisciplinary research project bringing together eight students and five mentors from various fields (archaeology, chemistry, wood science, and agronomy–pedology). The main objective of the research was to study the impact of climate change on the degradation of archaeological and recent wood from the Ljubljana Marshes. To simulate natural conditions, we conducted a soil survey and excavated a soil profile to a depth of 1.7 meters at the Department of Wood Science. In five selected soil horizons (A, I, II, III, and V), 15 samples of archaeological and recent wood (oak and ash) were buried at different depths, each equipped with sensors to monitor moisture and temperature.

Measurements were conducted at 12-hour intervals between 13 June and 28 August 2024. The data showed that soil temperature and moisture varied with weather conditions, with changes becoming less pronounced with increasing depth. The analysis of wood moisture content revealed that archaeological wood absorbed more water but lost it more rapidly than recent wood, indicating its greater vulnerability. The most favorable conditions for the preservation of archaeological wood were found in the deepest soil horizon (V), where stable, reductimorphic conditions prevail.

The findings indicate that climate change accelerates the degradation of buried wood (Anžur et al., 2024). The results of the project and the methodology developed for real-time monitoring of archaeological wood are essential for understanding wood–soil interactions and will contribute to planning of appropriate conservation strategies and the discussion on new approaches for the preservation of pile-dwelling sites.

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5 Ise Jingū kot eblematski primer japonske kulturne dediščine in turistična destinacija

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Ise Jingū je eno izmed najpomembnejših šintoističnih svetišč na Japonskem, znano po svoji praksi periodične obnove vsakih dvajset let (shikinen sengū). Ta tradicija, ki vključuje izmenično podiranje starega in postavljanje novega verskega kompleksa na dveh sosednjih parcelah, namesto ohranjanja izvirnega materiala poudarja kontinuiteto ritualov in obrti. Pogosto se navaja kot primer japonskega pristopa k dediščini in širšega razumevanja kulturne raznolikosti in dediščine v konservatorstvu (Adams 1998).

Pomembno vlogo pri razvoju te paradigme je imela Narska listina o avtentičnosti, sprejeta na konferenci v Nari na Japonskem leta 1994. Poleg poudarka na kontinuiteti znanja in kulturnem kontekstu se je z njo uvedel tudi koncept »progresivnih avtentičnosti«, ki priznava zgodovinske plasti, pridobljene skozi čas, kot avtentične prispevke k dediščini.

V zahodnih akademskih krogih se Ise Jingū pogosto predstavlja kot emblematičen primer japonske nesnovne kulturne dediščine (Akagawa 2014), pri čemer je pogosto stereotipiziran kot paradigmatičen primer japonskega odnosa do avtentičnosti in konservatorskih praks. Takšna reduktivna interpretacija zanemarja njegove večplastne simbolne in metaforične pomene, ki jih lahko prepoznamo tako v nacionalnem kot tudi v mednarodnem kontekstu (Sand 2015). Hkrati se umešča v širši problem spomeniške dediščine na Japonskem, kjer se ohranjanje kulturnih krajin in praks prepleta s sodobnimi dediščinskimi politikami in turizmom.

Ise Jingū sem v začetku aprila 2025 obiskal v okviru širše terenske raziskave na Japonskem. Prek informacijskih tabel, brošur, spominkov in neformalnih pogovorov z obiskovalci in zaposlenimi sem raziskoval diskurze in podobe, skozi katere se svetišče danes predstavlja. Obenem sem poskušal prepoznati morebitne spremembe, ki so nastale pod vplivom religijskega in dediščinskega turizma. Na primeru verskega kompleksa v Iseju želim pokazati, kako akademski diskurz o kulturni dediščini in komercializacija za potrebe turizma skupaj oblikujeta izkušnjo ogleda dediščine ter vplivata na njeno interpretacijo in ohranjanje v sodobnem svetu.

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Sand, Jordan 2015. Japan's Monument Problem: Ise Shrine as Metaphor. Past & Present 226(suppl_10): 126–152.

Ise Jingū as an Emblematic Example of Japanese Cultural Heritage and a Tourist Destination

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Ise Jingū is one of the most important Shinto shrines in Japan, known for its practice of periodic renovation every twenty years (shikinen sengū). This tradition, which involves the alternating demolition of the old and the erection of a new religious complex on two adjacent plots, emphasises the continuity of rituals and crafts rather than the preservation of the original material. It is often cited as an example of the Japanese approach to heritage and the wider understanding of cultural diversity and heritage in conservation (Adams 1998).

The Nara Charter on Authenticity, adopted at the Nara Conference in Japan in 1994, played an important role in the development of this paradigm. In addition to its emphasis on the contingency of knowledge and cultural context, it introduced the concept of 'progressive authenticities', which recognises historical layers acquired over time as authentic contributions to heritage.

In Western academic circles, Ise Jingū is often presented as an emblematic example of Japan's intangible cultural heritage (Akagawa 2014), often stereotyped as a paradigmatic example of Japanese attitudes towards authenticity and conservation practices. Such a reductive interpretation neglects its multiple symbolic and metaphorical meanings, which can be identified in both national and international contexts (Sand 2015). At the same time, it is situated within the broader problem of heritage in Japan, where the conservation of cultural landscapes and practices is intertwined with contemporary heritage policies and tourism.

I visited Ise Jingū in early April 2025 as part of a wider field research project in Japan. Through information boards, brochures, souvenirs and informal conversations with visitors and staff, I explored the discourses and images through which the shrine presents itself today. At the same time, I have tried to identify possible changes that have occurred under the influence of religious and heritage tourism. Using the example of the religious complex at Ise, I aim to show how the academic discourse on cultural heritage and commercialisation for tourism purposes together shape the experience of visiting heritage sites and influence their interpretation and conservation in the contemporary world.

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6 Razumevanje izobraževanja o kulturni dediščini: percepcije, zanimanja in učne izkušnje

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Namen te raziskave je preučiti, kako se ljudje učijo in izobražujejo o kulturni dediščini, pa tudi njihov pogled na to, kaj je kulturna dediščina, saj je bila ta vselej obravnavana kot dopolnilni spremljevalec različnih predmetov v šolah in ne kot edini poudarek. Raziskali smo tudi različne vidike izobraževanja o kulturni dediščini, pri čemer smo se osredotočili na učence z različnimi interesi in ozadji. Izvedli smo polstrukturirane intervjuje s študenti in profesorji različnih fakultet Univerze na Primorskem v Kopru, da bi bolje razumeli izobraževanje o dediščini z različnih vidikov. Skupaj s spletno anketo in opazovanjem z udeležbo želimo razkriti pravo vrednost izobraževanja o dediščini. Očiten poziv po več znanja v zvezi s kulturno dediščino nas je spodbudil k bolj zavzetemu raziskovanju te teme. Končni rezultat nam bo pomagal bolje razumeti, kako dediščinsko izobraževanje dojemajo in doživljajo na različnih stopnjah izobraževanja ter v različnih demografskih skupinah.

Understanding Cultural Heritage Education: Perceptions, Interests, and Learning Experiences

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This research aims to explore the ways people learn and are educated about cultural heritage, as well as their perspective of what cultural heritage is, since it has always been seen as a complementary companion of different courses at schools rather than a sole focus. We have also examined different aspects of heritage education focusing on students with diverse interests and backgrounds. We have conducted semi-structured interviews with students and professors across different faculties at the University of Primorska in Koper, Slovenia, to better understand the heritage education from various angles. Along with the online survey and participant observation, we aim to reveal the genuine value of heritage education. The evident appeal for more knowledge regarding cultural heritage motivated us to research this topic with greater dedication. The final result will help us better understand how heritage education is perceived and experienced at different educational levels and by different demographics.

7 Zini kot živa dediščina: alternativne perspektive v kulturnem turizmu

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Zini so samostojne, nekomercialne publikacije v majhnih nakladah, ki vključujejo avtobiografske zapise, ilustracije, politične komentarje in več. Pogosto odražajo perspektive protikulturnih gibanj in marginaliziranih skupnosti, zato predstavljajo redke arhivske sledi teh skupin ter imajo zgodovinski in kulturni pomen v kontekstu dediščine. Prispevek raziskuje, kako lahko procesi ustvarjanja, branja in distribucije zinov ponudijo smiselno alternativno turistično izkušnjo.

Naša metoda združuje avtoetnografijo s sodelovalno refleksijo. Avtor je opravil raziskovalni obisk v Avstraliji, kjer se je spoznal z zin kulturo. Nato so avtorji izvedli skupno analizo skozi razpravo in dialog o izbranih zinih. To je služilo kot metoda elicitacije, kar nam je omogočilo, da smo skupaj zgradili vpogled v njihovo vrednost za dediščinski turizem.

Srečanja z brezplačnimi zini v knjižničnem arhivu, prodajnim avtomatom za zine in izmenjevalnimi dogodki so jih razkrila kot intimna, čustvena in včasih nerodna okna v življenja drugih ljudi. Ustvarjanje zina na vlaku je postalo tiho, a pomembno dejanje samoizražanja, izmenjevalni dogodek pa je prikazal živahno, povezano lokalno skupnost – kar je potrdilo zine kot ustvarjalna dela in nesnovno kulturno dediščino. Zini tako ponujajo alternativni način pripovedovanja zgodb, ki se upira senzacionalizmu in daje prednost vsakdanjim izrazom dediščine.

Naša analiza je izpostavila zine kot alternativno orodje dediščinskega turizma. Prvič, omogočajo kreativni turizem z možnostjo soustvarjanja skupaj z lokalnimi skupnostmi na delavnicah ali dogodkih. Drugič, predstavljajo bolj vključujočo alternativo uradnim dediščinskim narativam, saj poudarjajo marginalizirane glasove, zlasti v kontekstih, kjer dediščinski turizem utrjuje prevladujoče politične agende in hegemonistične zgodovine. Nazadnje, njihova analogna narava spodbuja počasni turizem, ki obiskovalce spodbuja, da si vzamejo čas, se premišljeno gibljejo in negujejo radovednost. Zini tako niso le alternativni arhivi kraja, temveč tudi način za globlje razumevanje destinacije in krepitev »identitete prostora«.

Zines as Living Heritage: Alternative Narratives in Cultural Tourism

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Zines are DIY, non-commercial, small-circulation publications featuring autobiographical writing, reviews, illustrations, political commentary, and more. Often reflecting the perspectives of countercultural movements and marginalized communities, they serve as rare archival traces of these groups, thus holding historical and cultural significance within heritage contexts. This paper explores how the processes of making, reading, and distributing zines can offer a meaningful alternative cultural tourism experience.

Our method combines autoethnography with collaborative reflection. The author undertook a research visit to Australia, engaging in zine culture. Following this, the authors engaged in dialogic, collaborative analysis by discussing selected zines together. This acted as a method of elicitation, enabling us to reflect on the zines' to co-construct insights into their value for heritage tourism.

Encounters with free zines in a library archive, a zine vending machine, and swap events revealed them as intimate, emotional, and sometimes awkward windows into others' lives. Creating a zine on a train became a quiet yet significant act of self-expression, while a swap event showcased the vibrant, interconnected local community – affirming zines as both creative works and intangible cultural heritage. In doing so, zines offer an alternative storytelling mode that resists spectacle and privileges everyday expressions of heritage.

Our analysis highlighted zines as an alternative tool for heritage tourism. First, they enable creative tourism through the possibility of co-creation alongside local communities in workshops or events. Second, they offer a more inclusive alternative to official heritage narratives by amplifying marginalized voices, especially in contexts where heritage tourism reinforces dominant political agendas and hegemonic histories. Finally, their analog nature promotes slow tourism, encouraging visitors to take their time, move deliberately, and embrace curiosity. Zines are thus not just alternative archives of a place, but means to deeper understand a destination and strengthen its "sense of place".

8 Kulturne relikvije iz puščave v srce imperija

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Namen prispevka je prikazati metode, ki jih je ob prehodu v 20. stoletje v puščavi Taklamakan, na severozahodu Kitajske, za zbiranje kulturnih relikvij uporabil britanski uradnik Mark Aurel Stein. In ga v okviru takratnih kitajskih družbeno-političnih okoliščin obsoditi v smislu imperialističnega izkoriščanja. Do potrditve trditve, da je Stein pri Dunhuangu deloval s pomočjo orientalističnega razmerja znanstvene, politične in moralne premoči »nas« (Zahodnjakov) proti »njim« (Vzhodnjakom), ki so dekadentni, nevedni in zatorej potrebni pomoči, nas bo privedla analiza primarnih in sekundarnih virov, predvsem v angleškem in kitajskem jeziku.

Prispevek je razdeljen na tri enakovredne vsebinske sklope, ki nam bodo pomagali pri celostnem razumevanju funkcioniranja imperialističnega aparata na primeru Steinovega delovanja. V prvem sklopu si bomo ogledali obseg britanskega imperija konec 19. stoletja, metode njegove racionalizacije in vzdrževanja ter načine, ki so bili uporabljeni za njegovo predstavljanje v matični državi. V drugem poglavju bomo med opisovanjem severozahodne Kitajske na prehodu v 20. stoletje spoznali, kako je na tamkajšnjo realnost vplivala bližina ruskega in najpomembnejšega dela britanskega imperija – Indije –, od koder so na področje Tarimske kotline vstopali raziskovalci, ki so za muzeje svojih držav, in z njihovo finančno podporo, zbirali starodavne kitajske relikvije. V zadnjem vsebinskem sklopu si bomo podrobneje ogledali delo enega izmed njih, katerega uspehi so kitajski kulturno-zgodovinski dediščini vtisnili močan in neizbrisljiv pečat.

Za v prihodnje se nadejamo odgovoriti na vprašanje, ali se lahko naše videnje sodobnega muzeja spremeni, če vemo, da so njegovi predhodniki delovali z roko v roki s kolonializmom?

Cultural Relics from the Desert to the Heart of Empire

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The aim of this paper is to illustrate the methods used by the British official Mark Aurel Stein to collect cultural relics in the Taklamakan Desert, north-west China, at the turn of the 20th century. And to condemn it, in the context of the Chinese socio-political circumstances at the time, in terms of imperialist exploitation. An analysis of primary and secondary sources, mainly in English and Chinese, will lead us to confirm the claim that Stein was working at Dunhuang through an Orientalist relationship of scientific, political and moral superiority of "us" (Westerners) against "them" (Easterners), who are decadent, ignorant and therefore in need of help.

The paper is divided into three equal thematic strands that will help us to understand the functioning of the imperialist apparatus in a comprehensive way, using Stein's example. In the first strand, we will look at the extent of the British Empire at the end of the nineteenth century, the methods used to rationalise and maintain it, and the ways in which it was represented in the mother country. In the second section, while describing north-west China at the turn of the twentieth century, we will see how the reality there was influenced by the proximity of Russia and the most important part of the British Empire - India - from where explorers entered the Tarim Basin to collect ancient Chinese relics for their countries' museums, and with their financial support. In the last section, we will take a closer look at the work of one of them, whose successes have left a strong and indelible mark on China's cultural and historical heritage.

For the future, we hope to answer the question: can our vision of the modern museum change if we know that its predecessors worked hand in hand with colonialism?

9 Digitalno ohranjanje in virtualna rekonstrukcija ohridske arheološke in kulturne dediščine

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Namen te predstavitve je izpostaviti bogato, a večinoma nedostopno arheološko in kulturno dediščino Ohridske regije, ki zaradi različnih vzrokov ostaja skrita javnosti. Glavni cilj projektov, ki so se izvajali med letoma 2021 in 2024, je bil ustvariti virtualne rekonstrukcije štirih ključnih arheoloških najdišč velikega kulturnega pomena na Ohridu. Ta najdišča, ki so bila dalj časa težko dostopna ali jih je bilo težje osebno doživeti, so zaživela s pomočjo naprednega 3D-modeliranja in virtualne tehnologije. Cilj projekta je bil javnosti omogočiti, da v digitalni obliki razišče in sodeluje s temi zgodovinsko pomembnimi lokacijami. Metodologija je združevala digitalno tehnično dokumentacijo skupaj z različnimi tehnikami za izdelavo natančnih virtualnih rekonstrukcij. Ta pristop je omogočil poglobljeno izkušnjo in uporabnikom ponudil globlje razumevanje arheološke in kulturne dediščine Ohrida ter njegovega zgodovinskega konteksta. Rezultati kažejo na velik potencial digitalnih tehnologij pri ohranjanju in predstavljanju arheoloških najdišč, s čimer so ta bolj dostopna svetovni javnosti. Poleg tega ta projekt prinaša dragocene podatke in spoznanja, ki lahko usmerjajo prihodnje raziskave na področju digitalnega ohranjanja, upravljanja kulturne dediščine in vključevanja tehnologije v ohranjanje dediščine.

Slika 1: Idealna virtualna rekonstrukcija štirih objektov na Ohridu. / An ideal virtual reconstruction of four buildings in Ohrid.

Digital Preservation And Virtual Reconstruction Of Ohrid's Archaeological And Cultural Heritage

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This presentation aims to highlight the rich yet mostly inaccessible archaeological and cultural heritage of the Ohrid region, which remains con cealed from the public due to various challenges. The primary objective of the projects carried out between 2021 and 2024 was to create virtual reconstructions of four key archaeological sites of significant cultural importance to Ohrid. These sites, which have long been difficult to access or experience in person, have been brought to life through advanced 3D modeling and virtual technology. The project aimed to provide the public with an opportunity to explore and engage with these historically important locations in a digital format. The methodology combined digital technical documentation, alongside various techniques for producing highly detailed virtual reconstructions. This approach allowed for an immersive experience, offering users a deeper understanding of Ohrid's archaeological and cultural heritage as well as its historical context. The results demonstrate the vast potential of digital technologies in preserving and showcasing archaeological sites, making them more accessible to a global audience. Additionally, this project provides valuable data and insights that can guide future research in the fields of digital preservation, cultural heritage management, and the integration of technology in heritage conservation.

10 Eksperimentalna arheologija: vpogled v kulturno dediščino skozi čas, povezovanje preteklosti s sedanjostjo in prihodnostjo

Anđelka Putica[1]
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Nastanek prazgodovinskih kulturnih artefaktov in njihovo ohranjanje skozi stoletja sta tesno povezana z obrtništvom. Tradicionalna obrtna izdelava je kompleksen koncept, ki ga preučujejo različne znanstvene discipline. Projekt »Ogenj, kamen, zemlja - rekonstrukcija procesa izdelave predmetov in kalupov iz bronaste dobe«, ki se je izvajal leta 2021, je bil namenjen povezovanju etnoarheologije z eksperimentalno arheologijo. Tudi za premostitev komunikacijske vrzeli med muzeji in njihovimi obiskovalci, muzejem pogosto očitajo, da se preveč osredotočajo na materialne vidike artefaktov. Namen projekta ni bil le rekonstrukcija starodavnih orodij, temveč tudi vpogled v tehnike izdelave, materiale in njihovo uporabo v boju. Projekt »Ogenj, kamen, zemlja – rekonstrukcija procesa izdelave predmetov in kalupov iz bronaste dobe« temelji na interdisciplinarnem sodelovanju med arheologi, obrtniki/rezbarji, livarji, konservatorji in etnologi. Ta interdisciplinarni okvir je arheologom omogočil, da so se poglobili v nianse izdelave in razumevanja uporabljenih materialov ter izpostavili kvalifikacije in kompetence, ki so jih potrebovali tisti, ki so ustvarjali te predmete. Namen projekta je bil bolje razumeti proces obdelave kovin v bronasti dobi s poskusom reprodukcije predmetov, za katere obstajajo dokazi –izvirni predmeti (litje votlih sekir), z uporabo metod, za katere obstajajo arheološki dokazi (kamniti kalup in tehnika izgubljenega voska). Po drugi strani pa so bile uporabljene tudi metode, ki bi se lahko uporabljale pri izdelavi predmetov v bronasti dobi, vendar niso bile arheološko potrjene (litje meča v peščeni kalup).

Eksperimentalno litje ima pomembno vlogo pri restavriranju in ohranjanju kulturne dediščine, saj pomaga ohranjati avtentičnost in celovitost artefaktov. Z uporabo tehnik, ki posnemajo izvirne proizvodne metode, in izbiro ustreznih materialov ta postopek pomaga ohranjati kulturno dediščino v obliki, ki je čim bolj podobna prvotnemu stanju.

Experimental Archaeology: Insights into Cultural Heritage Through Time, Connecting the Past with the Present and Future

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The creation of prehistoric cultural artifacts and their preservation over the centuries is closely linked to craftsmanship. Traditional craft production is a complex concept studied in various scientific disciplines. The project "Fire, Stone, Earth – Reconstructing the Process of Making Objects and Molds from the Bronze Age", implemented in 2021, aimed to integrate ethnoarchaeology with experimental archaeology. Also to bridge the communication gap between museums and their visitors, museums are often criticized for focusing too much on the material aspects of artifacts. The project was designed not only to reconstruct ancient tools, but also to provide insight into production techniques, materials and their use in combat. The project "Fire, Stone, Earth – Reconstructing the Process of Making Bronze Age Objects and Molds" is based on an interdisciplinary collaboration between archaeologists, artisans/sculptors, foundries, conservators and ethnologists. This interdisciplinary framework has enabled archaeologists to delve deeper into the nuanced aspects of making and understanding the materials involved, and to point out the qualifications and competencies required of those who created these objects. The aim of the project was to better understand the process of metalworking in the Bronze Age by attempting to reproduce objects for which there is evidence – original objects (casting of hollow axes), using methods for which there is archaeological evidence (stone mold and lost wax technique). On the other hand, methods that could have been used in the making of objects in the Bronze Age, but have not been archaeologically confirmed (casting of a sword in a sand mold), were also used.

Experimental casting plays an important role in the restoration and conservation of cultural heritage, as it helps preserve the authenticity and integrity of artifacts. By using techniques that mimic original production methods and selecting appropriate materials, this process helps preserve cultural heritage in a form as close to its original state as possible.

11 Ko stele ponovno pridobijo barve: prispevek hiperspektralnega slikanja k identifikaciji in kartiranju pigmentov na francoskih stelah (Vaucluse)

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Namen te študije je s pomočjo arheometričnih podatkov raziskati družbeni in kulturni pomen barvnih materialov na gorah Vaucluse in Luberon v obdobju neolitika. Osredotoča se na pigmente, zlasti železove oks(hidroks)ide in cinabarit, najdene na graviranih stelah (slika 1) – nekatere od njih so občasno povezane s pogrebnimi konteksti, čeprav je bila večina odkrita naključno, brez jasnega arheološkega okolja. Namen raziskave je raziskati raznolikost in izvor teh materialov ter njihove morebitne družbene in kulturne vloge.

Ključni cilj je preučiti prisotnost cinabarita na teh stelah, saj gre za nenavaden, nelokalni pigment, ki so ga morda prevažali na dolge razdalje in morda uporabljali zgolj za pogrebno uporabo. To odpira pomembna vprašanja: Kateri je bil vir cinabarita, uporabljenega za barvanje teh stel? Zakaj so se odločili za cinabarit, ko pa je v provansalski regiji na voljo veliko različnih železovih oks(hidroks)idov? Čeprav prejšnje raziskave kažejo, da so cinabarit uporabljali v kolektivnih pokopih v Španiji – uporabljali so ga na kosteh in predmetih v pogrebne namene –, ostajata neraziskana dva ključna vidika: (i) njegova uporaba na stelah in (ii) njegov potencialni pomen za stele, najdene v Provansi.

Za reševanje teh vprašanj lahko hiperspektralno slikanje omogoči odkrivanje pigmentnih sledi, ki so sčasoma zbledele, kot je bilo dokazano v študijah poslikanih skalnih zavetišč na prostem. Ta neinvazivna in prenosna tehnika lahko z analizo spektralnih signalov, ki se odbijajo od skalnih površin, določi tudi mineralno sestavo pigmentov. Poleg tega se za navzkrižno potrditev ugotovitev uporabljajo dopolnilne metode, kot sta Ramanova spektroskopija in SEM-EDS, kar zagotavlja celovito analizo na več ravneh.

Nazadnje, s primerjavo teh rezultatov z geološkimi viri barvnih materialov, lahko ta raziskava ponudi vpogled v starodavne izmenjevalne mreže, kroženje materialov in kulturne interakcije. Končno bi lahko osvetlila simbolne in konceptualne svetove neolitskih družb.

Slika 2: Primer poslikane stele (Puagère n°1), redek primer, kjer je pigment viden s prostim očesom. / Example of a painted stele (Puagère n°1), a rare example where the pigment is visible to the naked eye.

Zahvale

To raziskavo je podprl Idex Patrimalp. Zahvaljujemo se tudi regionalni arheološki službi PACA, ki nam je omogočila raziskavo, ter muzejem v Quinsonu, Apt, Saint-Germain-en-Laye, Lyonu, SERVHA in arheološkemu repozitoriju Aix-en-Provence za dostop do njihovih zbirk, ki so bile ključne za naše delo. To delo je podprla Francoska nacionalna agencija za raziskave v okviru programa „Investissements d'avenir“ (ANR-15-IDEX-02). To delo je bilo deležno tudi državne pomoči, ki jo upravlja Nacionalna agencija za raziskovanje v okviru programa za prihodnje naložbe, vključenega v program Francija 2030, z oznako ANR-17-EURE-0021 Ecole Universitaire de Recherche Paris Seine Humanités, Création, Patrimoine - Fondation des sciences du patrimoine. Del tega dela je bil podprt z nepovratnimi sredstvi programa LabEx OSUG@2020 (Investissements d'avenir - ANR10 LABX56). Création, Patrimoine - Fondation des sciences du patrimoine.

When Stelae Regain Their Colors: The Contribution of Hyperspectral Imaging to the Identification and Mapping of Pigments on French Stelae (Vaucluse)

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This study aims to use archaeometric data to explore the social and cultural significance of colouring materials in the Vaucluse and Luberon Mounts during the Neolithic period. It focuses on pigments, specifically ferruginous ox(hydrox)ides and cinnabar, found on engraved stelae –some of which are occasionally linked to funerary contexts, though most were discovered fortuitously with no clear archaeological setting. The research seeks to investigate the diversity and origins of these materials and their potential social and cultural roles.

A key objective is to examine the presence of cinnabar on these stelae, as it is an unusual, non-local pigment that may have been transported over long distances and possibly reserved for funerary use. This raises important questions: What was the source of the cinnabar used to colour these stelae? Why opt for cinnabar when the Provençal region naturally provides a wide range of iron ox(hydrox)ides? While previous research suggests that cinnabar was employed in collective burials in Spain – applied to bones and objects for funerary purposes – two key aspects remain unexplored: (i) its use on stelae, and (ii) its potential relevance to those found in Provence.

To address these questions, hyperspectral imaging may allow detecting pigment traces that have faded over time, as demonstrated in studies of painted open-air rock shelters. This non-invasive and portable technique can also determine the mineral composition of pigments by analysing spectral signals reflected by the rock surfaces. Additionally, complementary methods such as Raman spectroscopy and SEM-EDS are employed to cross-validate findings, ensuring a comprehensive, multi-scale analysis.

Finally, by comparing these results with geological sources of colouring materials, this research may offer insights into ancient exchange networks, material circulation, and cultural interactions. Ultimately, it could shed light on the symbolic and conceptual worlds of Neolithic societies.

Acknowledgments

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12 Neinvazivne metode za identifikacijo in odkrivanje umetnih kamnitih blokov zgodovinskih stavb v Sieni (Italija)

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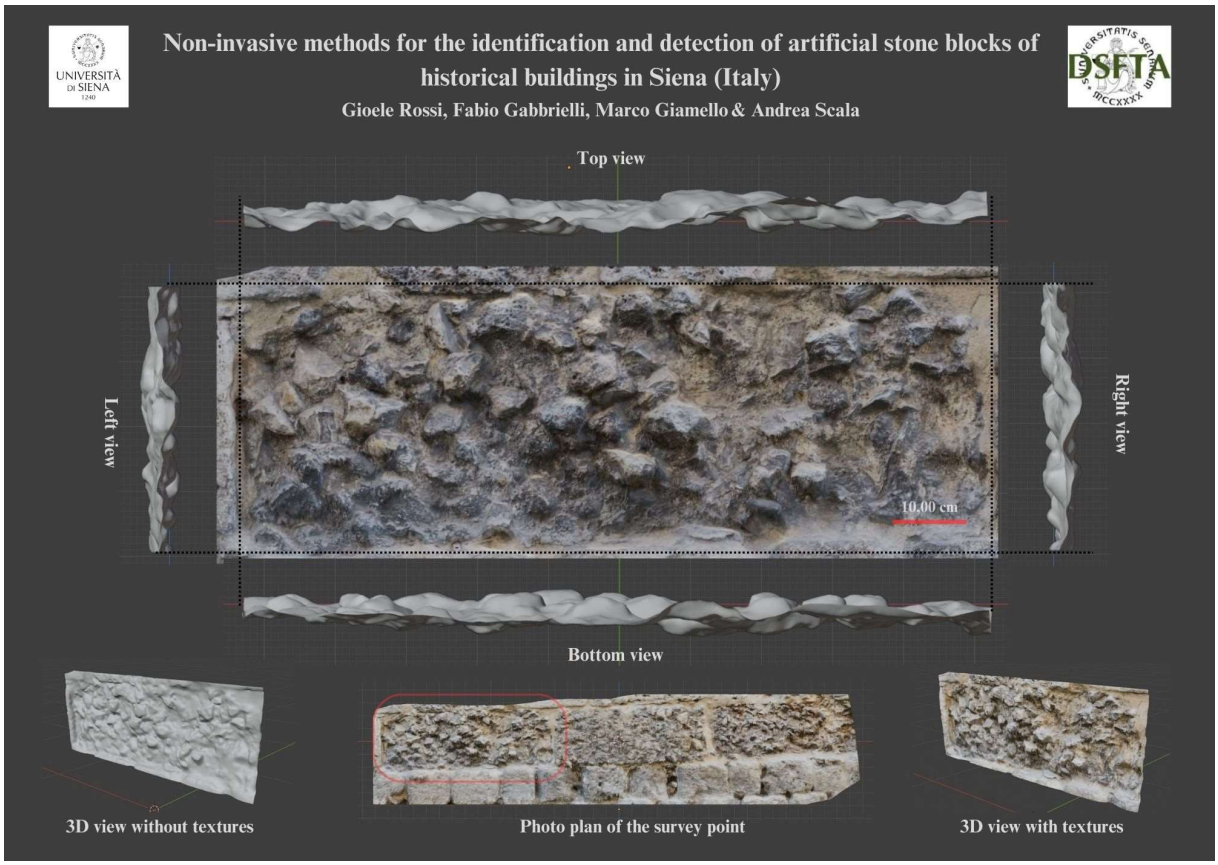
V zgodovinskem središču Siene (Italija) je na fasadah številnih zgodovinskih stavb mogoče najti bolj ali manj natančne imitacije naravnih kamnov. Ker so ti elementi zelo razširjeni, je bistveno sprejemati hitre in učinkovite metode raziskovanja in preučevanja. Te metodologije omogočajo ekonomične raziskave in situ, ki omogočajo splošno fenomenološko opazovanje ter izbiro območij in vzorčnih točk za zbiranje mikrovzorcev za poglobljeno laboratorijsko analizo, kar olajša spremljanje in ohranjanje arhitekturne dediščine. Sprejete raziskovalne metode temeljijo na optičnih in termografskih tehnikah ter tehnikah površinske analize, pri čemer je izhodišče vedno vizualni pregled, podprt z digitalnimi orodji, da bi ocenili teksturo in barvo materialov. Napredne tehnologije, kot so fotogrametrija, 3D skeniranje LiDAR in profilometrija, omogočajo natančno analizo geometrije blokov, ki sestavljajo fasado, podrobno kartiranje površine in količinsko opredelitev njene topografije, s preučevanjem dejanskega profila in ortogonalne raziskovalne ravnine na samo površino (Slika 1). Analiza tekstur je temeljnega pomena za razlikovanje materialov, ki jih sestavljajo. Primerjava med oblikami in dimenzijami blokov omogoča pomembne informacije o uporabljenih gradbenih tehnikah. Za ugotavljanje razlik v toplotni prevodnosti med litičnimi elementi in malto se uporablja infrardeča termografija, ki omogoča poudarjanje neenakosti v toplotnih odzivih materialov z različnimi lastnostmi in beleženje morebitnih anomalij, povezanih z degradacijo ali pojavom vlage. Z detektorjem kovin je mogoče ugotoviti prisotnost kovinske armature, ki je značilnost teh materialov, izdelanih od sredine 19. stoletja dalje. Sklenemo lahko, da neinvazivne raziskovalne metodologije in napredne tehnologije omogočajo učinkovito spremljanje zgodovinskih stavb v Sieni (Italija), kar olajša ohranjanje arhitekturne dediščine, ne da bi pri tem ogrozili izvirne elemente.



Slika 1: 3D-model in analiza dejanskega profila ter ortogonalne reliefne ravnine na zunanjo površino blokov iz umetnega kamna. / 3D model and analysis of the real profile and orthogonal relief plane to the external surface of the artificial stone blocks.

Non-Invasive Methods for Identification and Detection of Artificial Stone Blocks of Historical Buildings in Siena (Italy)

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In the historical centre of Siena (Italy) it is possible to find more or less faithful imitations of natural stones in the facades of many historical buildings. Since these elements are widely spread, it is essential to adopt rapid and efficient methods of survey and study. These methodologies allow for economical *in situ* surveys, allowing for general phenomenological observation and the choice of areas and sampling points for the collection of micro-samples for in-depth laboratory analysis, facilitating the monitoring and conservation of the architectural heritage. The surveying methods adopted are based on optical, surface analysis and thermographic techniques, always starting from the visual examination, supported by digital tools, in order to evaluate the texture and colour of the materials. Advanced technologies such as photogrammetry, *3D LiDAR* scanning and profilometry allow to precisely analyse the geometry of the blocks constituting a facade, mapping the surface in detail and quantifying its topography through the study of the real profile and the orthogonal survey plane to the surface itself (*Image n.1*). The analysis of the textures is

fundamental for the distinction of the constituent materials. The comparison between the shapes and dimensions of the blocks provides important information on the construction techniques employed. To identify variations in thermal conductivity between lithic elements and mortar, infrared thermography is used, which provides the possibility of highlighting inequalities in thermal responses for materials with different properties and of recording any anomalies related to degradation or humidity phenomena. Instead, a metal detector can be used to ascertain the presence of metal reinforcement, a distinctive feature of these materials produced starting from the mid-19th century. In conclusion, non-invasive survey methodologies and advanced technologies enable efficient monitoring of historic buildings in Siena (Italy), facilitating the conservation of architectural heritage without compromising the original elements.

13 Karakterizacija vonja staroegipčanskih mumij s kemično in senzorično analizo

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Mumifikacija v starem Egiptu je bila obredni postopek, namenjen ohranitvi telesa, da se zagotovi prehod duše v posmrtno življenje. Pri tem je imel ključno vlogo postopek balzamiranja z uporabo balzamov, olj, smol in voskov. Metode in materiali so se v različnih časovnih obdobjih in družbenih razredih razlikovali. Danes izkopavajo in hranijo veliko mumificiranih teles, večina tistih v muzejskih zbirkah pa je bila obdelanih. Ti posegi, vključno z uporabo rastlinskih olj in sintetičnih pesticidov, prvotnim materialom za balzamiranje dodajajo dodatne snovi.

Ta študija preučuje devet mumificiranih teles iz obdobja od Novega kraljestva do bizantinskega obdobja z neinvazivnim pristopom, ki se osredotoča na preučevanje hlapnih organskih spojin (HOS). S povezovanjem senzorične analize, termične desorpcije, plinske kromatografije, masne spektrometrije in vonjalne detekcije (TD-GC-MS-O) ter mikrobiološke analize je raziskava opredelila različne profile hlapnih snovi za mumificirana telesa. Ugotovitve kažejo na višje koncentracije in raznolikost hlapnih organskih spojin v mumificiranih telesih, razstavljenih v vitrinah, v primerjavi s tistimi v skladiščih. Ključni olfaktorični deskriptorji vključujejo lesne (78 %), pikantne (67 %) in sladke (56 %) note.

Klasifikacija odkritih spojin razkriva izvor iz prvotnih mumifikacijskih materialov in njihove razgradnje (etanojska kislina, α-pinene), rastlinskih olj, ki se uporabljajo za konzerviranje (D-limonen, (E)-cinamaldehid), sintetičnih pesticidov (1,2-diklorobenzen, 1,4-diklorobenzen) in mikrobiološke razgradnje (oktanol, 2-heptanon).

Ta študija predstavlja možnost raziskovanja razlik v tehnikah mumifikacije in stanju ohranjenosti mumificiranih teles z neinvazivnim pristopom ter poudarja pomen olfaktorne analize, ki lahko pripomore k celovitejšemu razumevanju kulturne dediščine.

Zahvale
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0228 in projekt poljskega Narodowe Centrum Nauki št. UMO-2020/39/I/HS2/02276), sofinanciranja raziskovalne dejavnosti Javne agencije za raziskovalno dejavnost Republike Slovenije (št. 20-MR.55995-122) in programske skupine N-DAD.

Characterization of the Smell of Ancient Egyptian Mummified Bodies using Chemical and Sensory Analysis

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The mummification practice in Ancient Egypt was a ritualistic process aimed at preserving the body to ensure the soul's transition into the afterlife. The embalming process played a crucial role in this preservation, through the use of balms, oils, resins, and waxes. The methods and materials varied across time periods and social classes. Nowadays, a large number of mummified bodies is being excavated and stored, and most of the ones in museum collections have been treated. These interventions, including the use of plant-based oils and synthetic pesticides, introduce additional compounds to the original embalming materials.

This study examines nine mummified bodies from the New Kingdom to the Byzantine period using a non-invasive approach focused on the study of volatile organic compounds (VOCs) emitted. By integrating sensory analysis, thermal desorption-gas chromatography-mass spectrometry-olfactory detection (TD-GC-MS-O), and microbiological analysis, the research identifies distinct volatile profiles for mummified body. The findings indicate higher concentrations and diversity of VOCs in mummified bodies exhibited in display cases compared to those in storage areas. Key olfactory descriptors include woody (78%), spicy (67%), and sweet (56%) notes.

The classification of detected compounds reveals origins from the original mummification materials and their degradation (Acetic acid, α-Pinene); plant oils used for conservation treatments (D-Limonene, (E)-Cinnamaldehyde); synthetic pesticides (1,2-Dichlorobenzene, 1,4-Dichlorobenzene); and microbiological deterioration (Octanol, 2-Heptanone).

This study demonstrates the possibility to investigate the differences in mummification techniques and the state of preservation of mummified bodies using a non-invasive approach and highlights the importance of olfactory analysis, which can lead to a more comprehensive understanding of the cultural heritage.

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14 Raziskava v Moderni galeriji: Katere plastične materiale vsebujejo muzejske zbirke?

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Plastični materiali so v zadnjem stoletju postali pomembni pri predmetih vsakdanjega življenja, hkrati pa se pojavljajo tudi v umetniških delih. V velikem deležu so zastopani tudi v zbirkah moderne zgodovine, vendar njihovo ohranjanje predstavlja velik izziv za muzeje in galerije. Plastika namreč ni zasnovana za dolgoročno uporabo in posledično začne relativno hitro izgubljati svoje prvotne lastnosti. Potreba po razumevanju sodobnih plastičnih materialov in vplivu različnih parametrov je tako ključnega pomena za ustrezno ohranjanje in konserviranje-restavriranje [1–3].

Prvi korak v načrtovanju ustreznih pristopov za razstavljanje in shranjevanje predmetov je poznavanje sestave materialov. Namen raziskave v Moderni galeriji je bil identificirati plastične materiale z uporabo prenosnih instrumentov in neporušnih metod *in situ*. Uporabili smo bližnjo infrardečo spektroskopijo (NIR) in infrardeče spektroskopije s Fourierovo transformacijo (FTIR; spektrometer z nastavkom za merjenje oslabljenega popolnega odboja - ATR), ki delujeta na principu odboja svetlobe od materiala. Analizirali smo 58 umetniških del iz devetih lokacij, vključno z dvema stalnima postavitvama v prostorih Moderne galerije in Muzeja sodobne umetnosti Metelkova. Od skupno pridobljenih 136 NIR in 18 FTIR spektrov, smo uspešno identificirali več kot tri četrtine plastičnih materialov. Preostali spektri niso ustrezali nobeni od glavnih preiskovanih skupin, bili so prekompleksni za enolično identifikacijo, ali pa je bila njihova kvaliteta preslaba.

Informacije, ki smo jih pridobili z raziskavo, predstavljajo dober temelj za oblikovanje ustreznih smernic za upravljanje zbirk Moderne galerije. Na podlagi analiz bo v prihodnosti treba ovrednotiti tudi možnost ločenega shranjevanja umetniških del glede na sestavo materialov, kar pa v kompleksnosti različnih materialov številnih umetniških del predstavlja popolnoma nov izziv.

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Research in the Museum of Modern Art: What Plastic Materials do Museum Collections Contain?

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Plastic materials have become an important part of everyday life in the last century and are also appearing in art. They represent a significant part of the collections of modern history, but their preservation poses a major challenge for museums and galleries. Plastic is not designed for long-term use and therefore loses its original properties relatively quickly. The need to understand modern plastic materials and the influence of various parameters is therefore crucial for appropriate conservation and preservation [1-3].

The first step in planning appropriate approaches for exhibiting and storing objects is to understand their material composition. The aim of the research at Moderna Galerija was to identify plastic materials using portable instruments and non-destructive in-situ methods. We used near-infrared spectroscopy (NIR) and Fourier transform infrared spectroscopy (FTIR; attenuated total reflection - ATR attachment), both of which are based on the principle of light reflection from the material. We analysed 58 artworks from nine locations, including two permanent exhibitions at the Moderna Galerija and the Museum of Contemporary Art Metelkova. Of the 136 NIR and 18 FTIR spectra we obtained, we were able to successfully identify more than three quarters of the plastic materials. The remaining spectra did not correspond to any of the main investigated groups, were too complex for unambiguous identification or were of insufficient quality.

The information obtained from the research forms a solid basis for the development of appropriate guidelines for management of the Moderna Galerija collections. Based on the analyses, it will also be necessary in the future to evaluate the possibility of storing works of art separately according to their material composition, which is a completely new challenge given the complexity of the various materials of many works.

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15 Analiza lesene konstrukcije poškodovane v požaru – lesena kašča Zaprice Kamnik

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Muzej na prostem Zaprice v Kamniku, Slovenija, se nahaja poleg gradu Zaprice, ki je skupaj z več kaščami vpisan v register kulturne dediščine (EID: 1-09881). Ena od kašč iz leta 1828 je bila decembra 2024 poškodovana v požaru. Ocenili smo obseg poškodb in trenutno stanje objekta. Za oceno stanja kašče na terenu smo uporabili več metod, vključno z vizualno oceno, 3D skeniranjem, meritvami električne upornosti za določitev vsebnosti vlage, elementno analizo, meritvami z resistografom, preletom zvoka in izvlekom vijaka. Za podrobnejše analize smo vzeli vzorce strešnih elementov, ki so jih odstranili gasilci. S svetlobno mikroskopijo in hiperspektralnim slikanjem smo določili lesno vrsto in globino obžganega območja. Poleg tega smo določili gostoto lesa ter upogibno trdnost in modul elastičnosti pri tritočkovnem upogibu. V močno poškodovanih lesenih elementih zaradi požara, so bile prisotne tudi izletne odprtine lesnih škodljivcev in rjava trohnoba. Povišana vsebnost vlage ni bila presenetljiva, saj je bil les popolnoma namočen med gašenjem. Lesna vrsta je bila določena kot smreka (*Picea abies*) s povprečno gostoto 418 kg/m^3. Vrednosti upogibne trdnosti in modula elastičnosti so bile približno 30 % nižje kot pri referenčnih vzorcih, s povprečnimi vrednostmi 52,9 MPa in 7,225 GPa. Hiperspektralno slikanje je pokazalo, da je bil les pod zoglenelo površino delno kemično spremenjen zaradi pirolize.

Analysis of Wooden Structure Damaged by Fire – the Wooden Granary Zaprice Kamnik

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Zaprice Open-Air Museum in Kamnik, Slovenia, is located next to Zaprice Castle, which, together with several granaries, is part of the Culture Heritage Register (EID: 1-09881). One of the wooden granaries from 1828 was damaged by fire in December 2024. The extent of damage and current condition of the granary affected by fire were evaluated. Several methods were used to assess the state of the granary on site, including a visual assessment, 3D scan, electrical resistance to determine moisture content, elemental analysis, resistograph measurements, time-of-flight and screw withdrawal. Samples of roof elements, that had been removed by firefighters, were collected for a more detailed analysis off-site. Light microscopic analysis and hyperspectral imaging were performed to determine wood species and the depth of charring. In addition, density and MOR/MOE in a three-point bending test were determined. Openings caused by wood borers and brown rot were present although the object was more severely damaged by the fire. Increased moisture content of samples was not unusual considering water was used to extinguish the flames. The wood species was determined to be spruce (*Picea abies*) with an average density of 418 kg/m^3. MOR and MOE values were around 30% lower than in reference samples, with the averages being 52,9 MPa and 7,225 GPa, respectively. Hyperspectral imaging revealed that the wood under the charred surface was partially chemically altered by pyrolysis.

16 Ponovno povezane tovarne. Povezovanje industrijske dediščine z ozaveščenostjo javnosti

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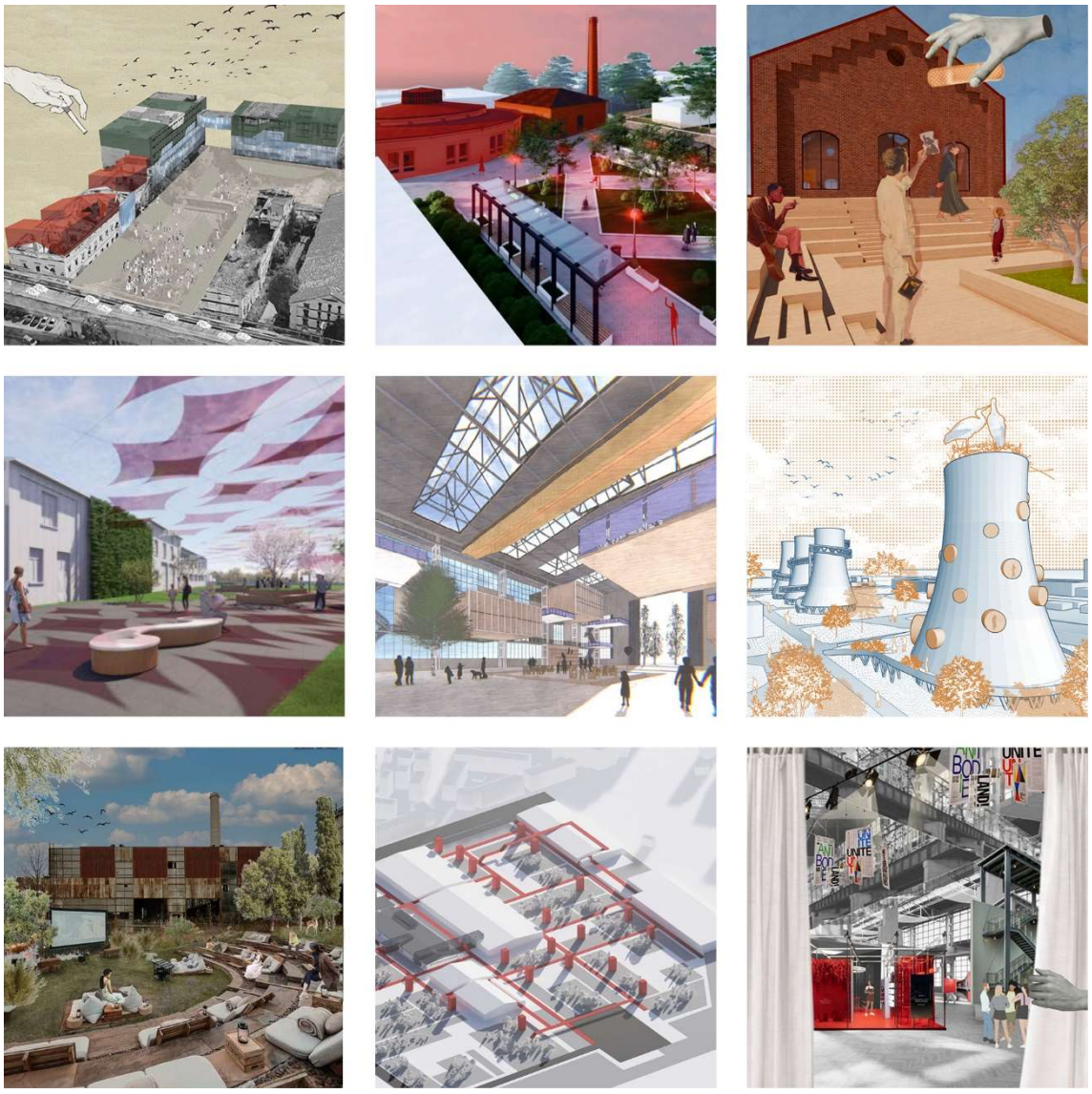
Industrijska revolucija je povzročila korenite spremembe v mestnem okolju, saj so se industrijska poslopja hitro spreminjala po obsegu in arhitekturnih slogih. Paradoksalno je isti tehnološki napredek, ki je spodbujal industrializacijo, povzročil tudi zastarelost starih tovarn. Te impozantne zgradbe, ki jih odlikujejo veličina, oblika in prostorske lastnosti, pogosto samevajo in propadajo.

V Romuniji pritisk urbanega razvoja ogroža ohranjanje te dragocene industrijske dediščine. Brez skladnih strategij ohranjanja in prilagoditve ponovne uporabe, tvegamo nepovratno izgubo teh pomembnih ostalin naše industrijske preteklosti.

Namen te raziskave je odkriti in določiti posebna merila za popisovanje, dokumentiranje in spodbujanje zglednih in raznolikih industrijskih stavb v mestu Iaşi. Naš cilj je vzpostaviti ogrodje platforme, ki jo je mogoče razširiti na širšo geografsko raven. Posledično iščemo možne vzorce za povezovanje teh pozabljenih objektov s pomembnimi mestnimi prostori in, kar je najpomembneje, z ozaveščanjem javnosti.

Obstoječi zapuščeni prostori so skrbno povezani z uspešnimi zgodbami o ponovni uporabi, ki dokazujejo, da lahko prilagodljiva ponovna uporaba industrijskih prostorov prinese številne koristi za skupnost z ustvarjanjem prepotrebnih prostorov, kot so kulturni centri, prostori za skupno delo in stanovanjske enote, brez velike porabe energije, ki se povzroča pri rušenju.

S spremembo namembnosti teh struktur za sodobne potrebe, lahko spodbudimo razvoj bolj živahnih in trajnostnih mest, ki so neločljivo povezana s svojo zgodovinsko narativo. Vključevanje skupnosti je pri teh prizadevanjih ključnega pomena, da bi izkoristili celoten potencial teh edinstvenih prostorov. Slika 1 prikazuje, kako so si učenci zamislili alternative za glavna območja industrijske dediščine v mestu Iaşi v Romuniji.



Slika 1: Predvidene alternative za najpomembnejše objekte industrijske dediščine v mestu Iaşi. / Envisioning alternatives for the most important sites of industrial heritage in Iaşi.

Re-linked Factories. Connecting Industrial Heritage with Public Awareness

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The Industrial Revolution precipitated a profound shift in the urban fabric, with industrial edifices undergoing rapid scale and architectural style evolution. Paradoxically, the same technological advancements that propelled industrialization also caused the obsolescence of old factories. These imposing edifices, distinguished by their grandeur, form, and spatial qualities, often languish in dereliction.

In Romania, urban development pressure imperils the preservation of this valuable industrial heritage. Without coherent conservation and adaptive reuse strategies, we risk the irretrievable loss of these significant vestiges of our industrial past.

This research intends to discover and calibrate the specific criteria for inventorying, documenting, and promoting exemplary and diverse industrial buildings in Iaşi. We aim to establish the formwork of a platform that can be scalable to a wider geographical level. Consequently, we search for potential patterns to connect these forgotten sites to meaningful urban spaces and, most importantly, to public awareness.

Existent derelict spaces are carefully linked to successful stories of reuse which demonstrate that the adaptive reuse of industrial spaces can yield numerous benefits for its community by creating much-needed spaces like cultural centers, co-working spaces, and residential units without a high energy consumption attributed to demolition.

By repurposing these structures to meet contemporary needs, we can foster the development of more vibrant, sustainable cities intrinsically linked to their historical narratives. Community engagement is paramount in this endeavor to realize these unique spaces' full potential. Figure 1 shows students' envisioning alternatives for the main industrial heritage sites in Iaşi, Romania.

17 Trebče 2.0 – iz preteklosti v sedanjost za prihodnost

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Projekt »Trebče 2.0 – iz preteklosti v sedanjost za prihodnost« je bil namenjen ohranjanju in raziskovanju kulturne dediščine vasi Trebče, s poudarkom na hišnih imenih in krajevnem narečju. Projekt je potekal v dveh fazah: raziskovalni del in praktični del (delo na terenu).

V prvi fazi so vaščani in osnovnošolci zbirali podatke o hišnih imenih, njihovem pomenu ter povezanih spominih in anekdotah. Na podlagi približno 80 zbranih prijavnic so odbornice SKD Primorec v spremstvu starejših vaščanov preverjale verodostojnost informacij ter dokumentirale hišna imena. V sodelovanju z dialektologinjo Karin Marc je nastal trebensko-slovenski slovar »Pa trjəbənsko«, zapisan z mednarodno fonetično abecedo, ki izpostavlja močno pripadnost prebivalcev slovenskemu jeziku, kljub vplivom italijanščine in nemščine.

Poleg raziskovalnega dela je projekt vključeval sodelovanje z Večstopenjsko šolo Opčine in Občino Repentabor, kar je osnovnošolcem omogočilo aktivno udeležbo pri spoznavanju kulturne in zgodovinske dediščine skozi oglede in vodene ekskurzije. Ključen element projekta so bile kamnite plošče s hišnimi imeni, vklesane s strani lokalnih kamnosekov, opremljene s QR-kodami za dostop do digitaliziranih informacij.

Kulturni doprinos projekta je nadgradila glasbena skupina The Authentics, ki je posnela pesem »Trjəbənka« v lokalnem narečju, pri čemer so sodelovali tudi vaščani.

Projekt je pokazal, kako lahko skupnost z inovativnim pristopom, sodelovanjem in sodobnimi tehnologijami prispeva k ohranjanju slovenske dediščine v zamejstvu ter krepi medgeneracijsko povezanost in pripadnost lokalnemu okolju.

Slika 1: Primer table s hišnim imenom. / Example of a house name board.

Trebče 2.0 – From the Past to the Present for the Future

Sonia Covolo Ciuch, Mija Kalc, Sabina Citter, Viviana Bukavez, Zorka Ferluga, Greta Kralj, Adriana Ciuk, Alina Carli, Eliana Scabar (odbornice Slovenskega kulturnega društva Primorec)[1]

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The project "Trebče 2.0 - From the Past to the Present for the Future" was aimed at preserving and researching the cultural heritage of the village of Trebče, with a focus on house names and the local dialect. The project was carried out in two phases: a research part and a practical part (fieldwork).

In the first phase, villagers and primary school pupils collected information on house names, their meaning and related memories and anecdotes. Based on the approximately 80 registration forms collected, the SKD Primorec committees, accompanied by older villagers, verified the authenticity of the information and documented the house names. In cooperation with dialectologist Karin Marc, the Treben-Slovenian dictionary "Pa trjəbənsko", written with the International Phonetic Alphabet, was created, highlighting the strong affiliation of the inhabitants to the Slovene language despite the influence of Italian and German.

In addition to the research work, the project involved cooperation with the Opčine Multigrade School and the Municipality of Repentabor, which enabled primary school pupils to actively participate in learning about the cultural and historical heritage through guided tours and excursions. A key element of the project was the stone plaques with house names, carved by local stonemasons and equipped with QR codes to access the digitised information.

The cultural contribution of the project was enhanced by the music group The Authentics, who recorded the song "Trjəbənka" in the local dialect, with the participation of the villagers.

The project showed how a community can contribute to the preservation of Slovenian heritage abroad through an innovative approach, cooperation and modern technologies, and strengthen intergenerational cohesion and belonging to the local environment.

18 Med barvo in sijajem: XRF analiza slikane in glazirane lončenine iz srednjeveškega trga Gutenwerd

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Otok pri Dobravi je danes popolnoma opuščeno srednjeveško urbano naselje ob reki Krki v jugovzhodni Sloveniji. V srednjem veku je tu stal Freisinški trg Gutenwerd, ki naj bi bil leta 1472 uničen v napadu Osmanskih čet. Po tem dogodku naselje naj ne bi bilo več poseljeno. Pričujoč prispevek predstavlja del moje magistrske naloge, kjer raziskujem izbrane odlomke lončenine in druge keramične predmete, najdene na Otoku med izkopavanji v letih 1972–1976. Med njimi je tudi peščica odlomkov glazirane in slikane lončenine, ki smo jih analizirali z metodo rentgenske fluorescenčne spektrometrije (XRF). Ta metoda je nedestruktivna, kar pomeni, da lahko analiziramo vzorce, ne da bi jih uničili ali poškodovali. Cilj analize je določiti elementno sestavo glazur in pigmentov, ki so jih uporabljali lončarji, in s tem pridobiti vpogled v tehnološke značilnosti uporabljenih surovin in proizvodnih postopkov. Poleg že predstavljenih ciljev pa se v predstavitvi ukvarjam tudi z vprašanjem kontinuitete tradicije lončarstva, saj imamo v naboru lončenine tudi odlomke, ki so mlajši od časa propada naselja.

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Between Color and Shine: XRF Analysis of Painted and Glazed Pottery from the Medieval Market Town of Gutenwerd

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Otok pri Dobravi is a now completely abandoned medieval urban settlement on the Krka River in south-eastern Slovenia. In the Middle Ages, the Freising Gutenwerd Market Town stood here, which was supposedly destroyed in 1472 in an attack by Ottoman troops. After this event, the settlement was supposedly no longer inhabited. This presentation forms part of my master's thesis, in which I examine selected pottery fragments and other ceramic objects found on the island during excavations in 1972-1976. These include a handful of glazed and painted pottery sherds, which were analysed by X-ray fluorescence spectrometry (XRF). This method is non-destructive, which means that we can analyse the samples without destroying or damaging them. The aim of the analysis is to determine the elemental composition of the glazes and pigments used by the potters, and thus to gain insight into the technological characteristics of the raw materials used and the production processes. In addition to the objectives already outlined, the presentation also deals with the question of the continuity of the pottery tradition, since the pottery assemblage includes fragments that are younger than the time of the collapse of the settlement.

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Assoc. Prof. Dr. Katarina Katja Predovnik (University of Ljubljana, Faculty of Arts, Department of Archaeology), Assoc. Prof. Dr. Nastja Rogan Šmuc (University of Ljubljana, Faculty of Natural Sciences and Engineering, Department of Geology), and Dr. Tomaž Nabergoj (National Museum of Slovenia).

19 Čiščenje z geli na medaljonu *Poletje* iz cikla štirih letnih časov

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Poletje je eden izmed štirih medaljonov z motivi letnih časov, ki so krasili stopnišče danes porušene stavbe v Ljubljani. Gre za poslikavo neznanega avtorja iz 19. stoletja, ki je bila ob rušenju stavbe v 80. letih 20. stoletja sneta in hranjena na Restavratorskem centru. Kakovostno ohranjena oljna poslikava je bila prekrita z več plastmi nečistoč, sekundarnim zaščitnim premazom in ostanki opleskov.

Raziskovali smo najprimernejšo metodologijo čiščenja površine in ob tem preizkusili sodobne metode po recepturah Richarda Wolbersa. Poskusili smo s pufrskimi vodnimi raztopinami v varnem območju pH 6, 8 in 9 in njihovim geliranjem s ksantanskim gelom. Zaščitni premaz smo odstranili z acetonom in razkrili močno vezano nečistočo na površini barvne plasti, ki smo jo uspešno odstranili z geliranim pufrom z borovo kislino in EDTA. Uporaba vodnih sistemov se je izkazala za učinkovito in varno alternativo organskim topilom. Ob čiščenju se je odprlo vprašanje, do katere mere odstraniti nečistoče in obenem ohraniti enoten videz umetnine ter ali se po čiščenju odločiti za zaščitni premaz, ki bi bil lahko uporabljen tudi ob nastanku poslikave, a o tem še nimamo podatkov. Vzorci, odvzeti za naravoslovne analize, so namreč še v delu. Ključni izziv ostaja estetska prezentacija medaljona skupaj s štukaturnim ometom in umestitev vseh štirih medaljonov v celoto.

Slika 1: Prikaz očiščenih in neočiščenih predelov medaljona Poletje (foto: Kristina Klemenčič). / Display of cleaned and uncleaned areas of the Summer medallion (photo: Kristina Klemenčič)

Zahvale
Zahvaljujem se Restavratorskemu centru, Oddelku za stenske poslikave in mozaike, Oddelku za štafelajno slikarstvo in Naravoslovnemu oddelku za možnost dela na fragmentu, mentorstvo, strokovna menja, nasvete pri delu ter možnost uporabe prostorov in opreme.

Gel Cleaning on the Medallion Summer from the Cycle of the Four Seasons

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Summer is one of four medallions with seasonal motifs that decorated the staircase of a now-demolished building in Ljubljana. It is a 19th-century painting by an unknown artist, which was taken down when the building was demolished in the 1980s and kept at the Restoration Centre. The well-preserved oil painting was covered with several layers of dirt, a secondary protective coating and remnants of paintwork.

We investigated the most appropriate methodology for cleaning the surface, testing modern methods based on Richard Wolbers' recipes. We experimented with buffered aqueous solutions in the safe pH range of 6, 8 and 9 and their gelation with xanthan gel. The protective coating was removed with acetone, revealing a strongly bonded impurity on the surface of the paint layer, which was successfully removed with a gelled buffer with boric acid and EDTA. The use of aqueous systems proved to be an effective and safe alternative to organic solvents. The cleaning raised the question of how far to remove the impurities while maintaining the uniform appearance of the artwork, and whether to opt for a protective coating after cleaning, which could also be used when the painting was created, but on which we have no information yet. The samples taken for the natural history analyses are still in the process of being analysed. The key challenge remains the aesthetic presentation of the medallion together with the stucco plaster and the integration of all four medallions into a whole.

Acknowledgements
I would like to thank the Restoration Centre, the Department of Wall Paintings and Mosaics, the Department for Easel Paintings and the Department of Natural Sciences Research for the opportunity to work on the fragment, the mentoring, the expert advice, and the use of the premises and equipment.

20 Trajnostni pristopi h konserviranju-restavriranju

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Ohranjanje kulturne dediščine je pomemben dejavnik na evropski sceni pri zmanjševanju negativnih vplivov na okolje, saj temelji na trajnostnih načelih ekologije, ekonomije in družbeno-kulturnih vidikov. V okviru magistrske naloge *Trajnostni pristopi h konserviranju-restavriranju stenskih poslikav* je bilo leta 2023 izvedeno anketiranje med strokovnjaki in študenti s tega področja. Rezultati so pokazali različne poglede na razumevanje trajnosti v stroki. Starejša generacija se bolj nagiba k družbeno-kulturnemu vidiku trajnosti, medtem ko mlajši strokovnjaki vidijo ekologijo in ekonomijo kot ključna dejavnika trajnostnega razvoja v konservatorstvu-restavratorstvu.

Enotno soglasje med generacijami je bilo doseženo le glede pomena kakovosti rezultatov konservatorsko-restavratorskih posegov, ki so bili prepoznani kot najpomembnejši kriterij in temelj za nadaljnje raziskave trajnosti v stroki. Poleg tega so bili oblikovani ključni trajnostni pristopi:

- učinkovita raba električne energije,
- izbira trajnostnih materialov,
- trajnostni prevoz,
- ravnanje z odpadki,
- digitalizacija in komunikacija.

Izračuni emisij in strategije ravnanja z odpadki kažejo, da trajnostni pristopi bistveno zmanjšujejo okoljski vpliv konservatorsko-restavratorskih projektov. Kljub napredku pri iskanju trajnostnih rešitev pa ostajajo izzivi, kot so omejen dostop do podatkov o materialih, regulative, ki zahtevajo tiskane dokumente, in energetske zahteve trajnostnih prevoznih sredstev.

Ena od možnih rešitev teh izzivov je oblikovanje usposobljenih prostovoljskih skupin, ki bi obiskovale dejanske projekte in pomagale optimizirati restavratorsko delo. Za prostovoljce bi to pomenilo pridobivanje neposrednih izkušenj s strokovnimi izzivi, vzpostavljanje stikov s potencialnimi delodajalci ter poglobljeno razumevanje trajnostnih pristopov v stroki. Izvajalci projektov bi pridobili dodatna strokovna svetovanja o trajnostnih praksah in možnost navezovanja stikov s prihodnjimi sodelavci. Z izboljšano ozaveščenostjo in usklajenimi ukrepi lahko konservatorska stroka ne le zmanjša svoj vpliv na okolje, temveč postane vzor trajnostnega delovanja tudi za druge panoge.

Sustainable Approaches to Conservation-Restoration

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Conservation of cultural heritage is an important factor on the European scene in reducing negative impacts on the environment, as it is based on sustainable principles of ecology, economics and socio-cultural aspects. In the framework of the Master's thesis *Sustainable Approaches to Conservation-Restoration of Murals*, a survey of experts and students in the field was carried out in 2023. The results showed different views on the understanding of sustainability in the profession. The older generation is more inclined towards the socio-cultural aspect of sustainability, while younger professionals see ecology and economics as key factors for sustainable development in conservation-restoration.

The only consensus between the generations was on the importance of the quality of the results of conservation and restoration interventions, which was identified as the most important criterion and the foundation for further research on sustainability in the profession. In addition, key sustainability approaches were formulated:

- efficient use of electricity,
- selection of sustainable materials,
- sustainable transport,
- waste management,
- digitisation and communication.

Emissions calculations and waste management strategies show that sustainable approaches significantly reduce the environmental impact of conservation and restoration projects. Despite progress in finding sustainable solutions, challenges remain, such as limited access to materials data, regulations requiring printed documents, and energy requirements of sustainable means of transport.

One possible solution to these challenges is the creation of trained volunteer groups to visit actual projects and help optimise restoration work. For volunteers, this would mean gaining first-hand experience of professional challenges, networking with potential employers and gaining a deeper understanding of sustainable approaches in the profession. Project implementers would gain additional professional advice on sustainable practices and the opportunity to network with future collaborators. Through improved awareness and coordinated action, the conservation profession can not only reduce its impact on the environment, but also become a role model for sustainable action for other sectors.

21 Topografija in katalogizacija poznoantičnih pokopov v Kopru

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Med arheološkimi najdišči, ki se nahajajo na nekdanjem območju koprskega otoka je bilo 20 takih, kjer so raziskovalci interpretirali najdene pokope kot poznoantične. Pogrebne prakse v pozni antiki na območju Slovenije in njene okolice odsevajo takratno stanje prepleta dveh kultur. Na eni strani se ohranijo še določeni staroselski, poganski elementi, hkrati pa ima krščanska vera vse večji vpliv na življenje in smrt, ki se vidi v pokopavanju z orientacijo vzhod-zahod, pokopavanju v mestih, pogosto ob cerkvenih objektih in v zmanjšanem številu grobnih pridatkov. To nam otežuje datacijo pokopov, zaradi česar si lahko pomagamo z radiokarbonskimi datacijami. Pri tem se je pokazal problem, saj so le te skelete datirale v srednji vek, keramični material in stratigrafija pa v pozno antiko. Tako lahko grobišča na severnem delu otoka datiramo v čas med 9. in 11. stoletjem, torej zgodnji srednji vek, medtem ko grobišča na njegovem vzhodnem delu lahko datiramo v pozno antiko ali zgodnji srednji vek.

Topography and cataloguing of Late Antique burials in Koper (Slovenia)

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Among the archaeological sites located in the former area of the island of Koper, there were 20 sites, where researchers interpreted the burials as Late Antique. Funerary practices in Late Antiquity in and around Slovenia reflect the state of the intermingling of two cultures at that T ime. On the one hand, certain indigenous, pagan elements are preserved. At the same time, the Christian religion has an increasing influence on life and death, seen in burials with an east-west orientation, burials in the town, often alongside church buildings, and with fewer grave goods. This makes it difficult to date burials, which is why radiocarbon dating can help. The problem appeared, when this analysis only dated the skeletons to the Middle Ages while the ceramic material and stratigraphy dated those same graves to Late Antiquity. Thus, we can date the burials on the island's northern part to the 9th and 11th centuries, i.e. the Early Middle Ages, while those on the eastern part to Late Antiquity or the Early Middle Ages.

22 Bioarheologija kot del znanosti o dediščini: pomen preučevanja preteklosti skozi interdisciplinarne pristope

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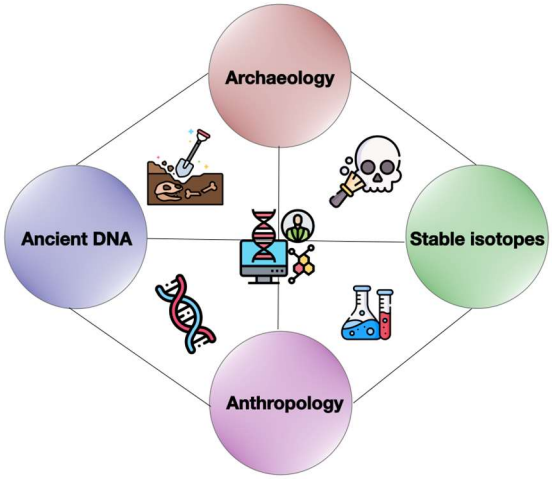
Bioarheologija je interdisciplinarna znanstvena veda, ki preučuje človeške, živalske in rastlinske ostanke iz arheoloških najdišč. Z uporabo metod, kot so arheogenetika, analiza stabilnih izotopov, osteološke raziskave in paleopatologija, lahko dobimo poglobljen vpogled v življenje, zdravje, prehrano in mobilnost preteklih populacij. Ti ostanki niso zgolj znanstveni viri, temveč tudi kulturna in biološka dediščina, ki nam pomaga razumeti dolgoročne spremembe v človeških skupnostih in njihovih okoljih.

Bioarheologija je ključen del dediščinske znanosti, saj nam omogoča ohranjanje in interpretacijo bioloških ostankov ter postavlja vprašanja o njihovem pomenu. Zakaj je pomembno preučevati bioarheološke ostanke? Kaj nam povedo o družbeni organizaciji, boleznih, prehrani in prilagajanju na okolje? Kakšen je njihov vpliv na sodobne populacije in kako jih lahko uporabimo za razumevanje naše lastne zgodovine? Poleg tega se pojavljajo etične dileme – kako upravljati z ostanki, ki so pogosto predmet kulturnih in verskih občutljivosti?

Dediščina ni omejena le na materialne ostanke, kot so stavbe ali artefakti, temveč vključuje tudi biološko dediščino, ki razkriva prilagoditve in preživetvene strategije naših prednikov. Bioarheologija zato združuje znanstvene in humanistične pristope ter prispeva k celostnemu razumevanju človekove preteklosti in njenemu varovanju za prihodnje generacije.



Slika 1: Primer interdisciplinarnega povezovanja različnih ved znotraj bioarheologije. / An example of interdisciplinary connections within the field of bioarchaeology.

Bioarchaeology in Heritage Science: The Importance of Interdisciplinary Research on the Past

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Bioarchaeology is an interdisciplinary field that studies human, animal and plant remains from archaeological sites. Using methods such as archaeogenetics, stable isotope analysis, osteological research and palaeopathology, we can gain a deeper knowledge into the life, health, diet and mobility of past populations. These remains are not only scientific sources but also cultural and biological heritage, helping us to understand long-term changes in human communities and their environment.

Bioarchaeology is a vital part of heritage science, enabling the preservation and interpretation of biological remains, while raising important questions about their significance. Why is it important to study bioarchaeological remains? What do they tell us about social organisation, disease, diet and environmental adaptation? How do they affect modern populations and how can they be used to understand our own history? There are also ethical dilemmas – how should we deal with remains that are often subject to cultural and religious sensitivities?

Heritage is not limited to material remains such as buildings or artefacts; it also includes biological heritage, which reveals the adaptations and survival strategies of our ancestors. Bioarchaeology therefore bridges scientific and humanistic approaches, contributing to a holistic understanding of human history and its preservation for future generations.

23 Nesnovna dediščina čebelarstva in uporaba umetne inteligence za avtomatizacijo pelodne analize medu

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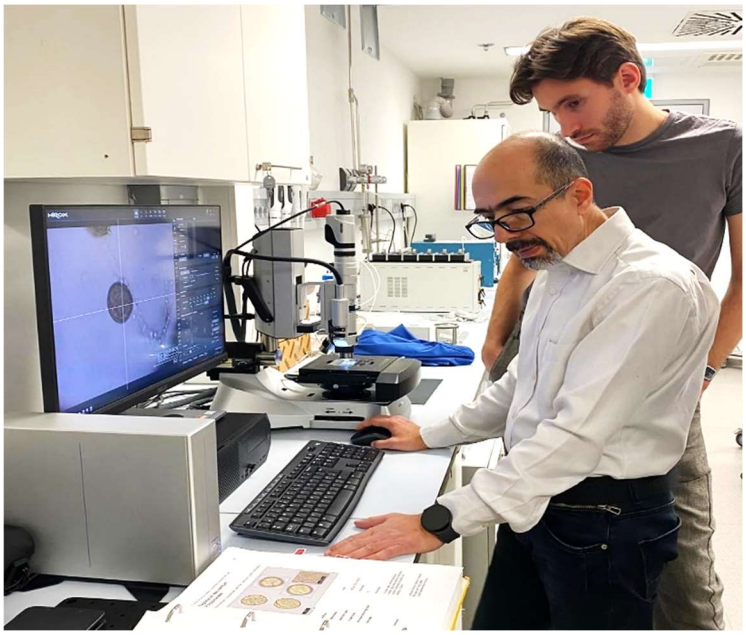
Čebelarstvo ima izjemno bogato zgodovino in predstavlja enega najreprezentativnejših primerov slovenske nesnovne dediščine. Prvo knjigo o čebelarstvu je že leta 1771 napisal slovenski čebelarski strokovnjak Anton Janša. Dejstvo, da smo Slovenci na področju ohranjanja dediščine čebelarstva izjemno angažirani, je bilo prepoznano tudi na mednarodnem nivoju, saj je bilo slovensko čebelarstvo kot način življenja leta 2022 vpisano na Seznam svetovne dediščine UNESCO.

Čebelarstvo vključuje številne družbeno-kulturne elemente, ki so neločljivo povezani s skrbjo za naravo. Temeljna čebelarska aktivnost je pridelava medu. Čebelarji prispevajo k vzdrževanju zdravega okolja za čebeljo pašo, med katero čebele nabirajo cvetni prah različnih rastlinskih vrst. Prisotnost različnih rastlin v čebelji paši lahko prepoznamo v pelodni sestavi medu. Tradicionalni tipi medu (npr. Kraški med), ki jih že stoletja pridelujejo na posamičnih geografskih območjih, so z vidika ohranjanja njihovih značilnosti, npr. okusa, barve, vonja in sestave, varovani z geografskimi označbami. Geografske označbe igrajo ključno vlogo pri zaščiti avtentičnih lokalnih čebelarskih izdelkov, saj zagotavljajo sledljivost in kakovost, hkrati preprečujejo zavajajoče označevanje porekla medu. Obenem prispevajo k oblikovanju lokalnosti in spodbujajo trajnostni turizem, ki temelji na kulturnih posebnostih območja.

V Evropski uniji kakovost medu ureja Direktiva o medu (2001/110/ES), v Sloveniji pa jo določa Pravilnik o medu (Uradni list RS, št. 4/2011). Pravilnik določa fizikalno-kemijsko, senzorično in pelodno analizo kot bistvene v postopku preverjanja kakovosti medu. Fizikalno-kemijske analize vključujejo merjenje vsebnosti vode, sladkorjev in hidroksimetilfurfurala (HMF), s senzorično analizo preverjajo organoleptične lastnosti, pelodna analiza pa je bistvena za določanje botaničnega in geografskega izvora medu (Debelak 2023). V sodelovanju s Čebelarsko Zvezo Slovenije in Slovensko Čebelarsko Akademijo smo se v naši raziskavi osredotočili na problem izvedbe pelodne analize. Trenutno se ta izvaja na način prostoročnega štetja pelodnih zrn pod mikroskopom, kar negativno vpliva na časovno ter izvedbeno učinkovitost, to ima negativen učinek na količino opravljenih analiz, posledično pa tudi vzdrževanje nadzora nad kakovostjo medu.

V našem projektu raziskujemo uporabo umetne inteligence (UI) za avtomatizacijo pelodne analize medu. Z metodo strojnega učenja in računalniškega vida nameravamo pokazati, da je mogoče vzpostaviti sistem za hitro in natančno prepoznavo pelodnih zrn, ki temelji na učenju iz podatkovne zbirke slik peloda. Del slik, ki bodo služile kot vir informacij za strojno učenje, bomo pridobili iz obstoječih spletnih baz. Drugi del, ki bo vključeval vzorce slovenskega medu, bomo pridobili s pomočjo laboratorijskega mikroskopiranja z digitalnim 3D mikroskopom Hirox. Prvo

fazo mikroskopskih analiz slovenskega medu smo že izvedli na Fakulteti za kemijo in kemijsko tehnologijo Univerze v Ljubljani.



Slika 2: Mikroskopiranje pelodnih preparatov in prepoznava tipov na podlagi pelodnega atlasa. / Microscopy of pollen slides and identification of types based on the Pollen Atlas.

Raziskava bo pripomogla k temu, da bo v prihodnosti mogoč učinkovitejši nadzor kakovosti, ki bo hkrati prispeval k višji zaščiti tradicionalnih tipov medu in s tem slovenske čebelarske dediščine.

Zahvale

Vsi člani raziskovalnega tima se iskreno zahvaljujemo za pomoč in strokovno podporo g. Aljažu Debelaku iz Čebelarske Zveze Slovenije ter Ibrahimu Elrefaeyu iz Laboratorija za dediščinsko znanost, za sodelovanje pa Čebelarski zvezi Slovenije ter Slovenski Čebelarski Akademiji.

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The Intangible Heritage of Beekeeping and the Use of Artificial Intelligence for the Automating The Pollen Analysis of Honey

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Beekeeping has an exceptionally rich history and is one of the best-known examples of intangible cultural heritage in Slovenia. The first book on beekeeping was written in 1771 by the Slovenian beekeeping expert Anton Janša. These facts have been recognised at an international level, as Slovenian "Beekeeping as a way of life" was inscribed on the UNESCO World Heritage List in 2022.

Beekeeping encompasses numerous socio-cultural elements that are inextricably linked to the conservation of natural environment. The fundamental activity of beekeeping is honey production. Beekeepers help to maintain a healthy environment in which bees can collect pollen from various plant species. The presence of different plants in the bee diet can be recognised by the pollen composition of the honey. Traditional honeys (e.g. Karst honey), which have been produced in certain geographical areas for centuries, are protected by geographical indications in order to preserve their characteristics such as taste, colour, aroma and composition. Geographical indications play a key role in protecting authentic local beekeeping products as they ensure traceability and quality while preventing misleading labelling of the origin of the honey.

In the European Union, honey quality is regulated by the Honey Directive (2001/110/EC) and in Slovenia by the Honey Regulation (Uradni list RS, no. 4/2011). The regulation stipulates that physico-chemical, sensory and pollen analyses are essential for checking the quality of honey. Physico-chemical analyses include the measurement of water content, sugar and hydroxymethylfurfural (HMF), while sensory analysis examines organoleptic properties and pollen analysis is crucial for determining the botanical and geographical origin of honey (Debelak, 2023). In cooperation with the Slovenian Beekeepers' Association and the Slovenian Beekeepers' Academy, our research focuses on the issue of conducting pollen analyses. Currently, this analysis is performed by manually counting pollen grains under a microscope, which has a negative impact on time and operational efficiency, leading to a decrease in the number of analyses performed and consequently affecting the ability to control the quality of honey.

In our project, we are exploring the use of artificial intelligence (AI) to automate the honey pollen analysis. Using machine learning and computer vision techniques, we aim to demonstrate that a system for fast and accurate identification of pollen grains can be developed based on learning from an image database of pollen . Part of the images that will serve as a source of information for machine learning will come from existing online databases. The other part, which includes samples of Slovenian honey, will be collected by laboratory microscopy using a digital 3D Hirox microscope. The first phase of microscopic analysis of Slovenian honey has already been carried out at the Faculty of Chemistry and Chemical Technology at the University of Ljubljana.

This research will contribute to more efficient quality control in the future, which will also contribute to better protection of traditional honey varieties and thus the Slovenian beekeeping heritage.

Acknowledgements

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24 HeriQuest: percepcija in vrednotenje kulturne dediščine

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Projekt HeriQuest, ki se izvaja v okviru mreže Eutopia in študentskih raziskovalnih pobud Univerze v Ljubljani, združuje 8 študentov in 3 mentorje, ki predstavljajo štiri različne oddelke in dve fakulteti Univerze v Ljubljani. Interdisciplinarno ekipo sestavljajo študenti in raziskovalci s Fakultete za kemijo in kemijsko tehnologijo ter Filozofske fakultete (Oddelki za arheologijo, etnologijo in kulturno antropologijo, slavistiko in azijske študije).

V projektu naslavljamo problem razumevanja različnih vrednosti kulturne dediščine in njihovega učinkovitega vključevanja v procese upravljanja z dediščino. Strokovnjaki že dlje časa ugotavljajo, da naslavljanje družbene vrednosti kulturne dediščine ni natančno opredeljeno. Nekatere vrednosti, ki so skupne različnim interesnim skupinam (tako strokovnjakom kot nestrokovnjakom), so vključene v proces odločanja in oblikovanja politik. Vendar pa obstajajo tudi vrednosti, ki jih nestrokovna javnost pripisuje dediščini, a iz strokovnega vidika niso prepoznane oz. niso prepoznane v enaki meri (Johnston 1992, Smith 2007, Dillon 2013). V našem projektu raziskujemo, kako nestrokovni deležniki – vključno z lokalnimi skupnostmi in širšo javnostjo – zaznavajo in medsebojno rangirajo različne vrednosti, ki jih pripisujejo dediščini. Na podlagi anket v dveh študijah primerov – v ljubljanskih Križankah in v Narodni galeriji – zbiramo mnenja deležnikov o vrednostih, ki jih pripisujejo dediščini. V prvem koraku smo izvedli intervjuje z enajstimi strokovnjaki iz različnih področij delovanja v kulturno-dediščinskem sektorju. Iz pogovorov smo izluščili trditve, ki smo jih analizirali v okviru fokusne skupine. Na podlagi premisleka v skupini smo oblikovali vprašalnik za anketo, ki odseva poglede strokovnjakov.

V drugem delu smo pričeli z izvajanjem anket na dveh lokacijah. V Narodni Galeriji smo pridobili informacije o tem, na kakšen način obiskovalci vrednotijo umetnine – premično kulturno dediščino, v Križankah pa smo enaka vprašanja zastavljali o nepremični kulturni dediščini.

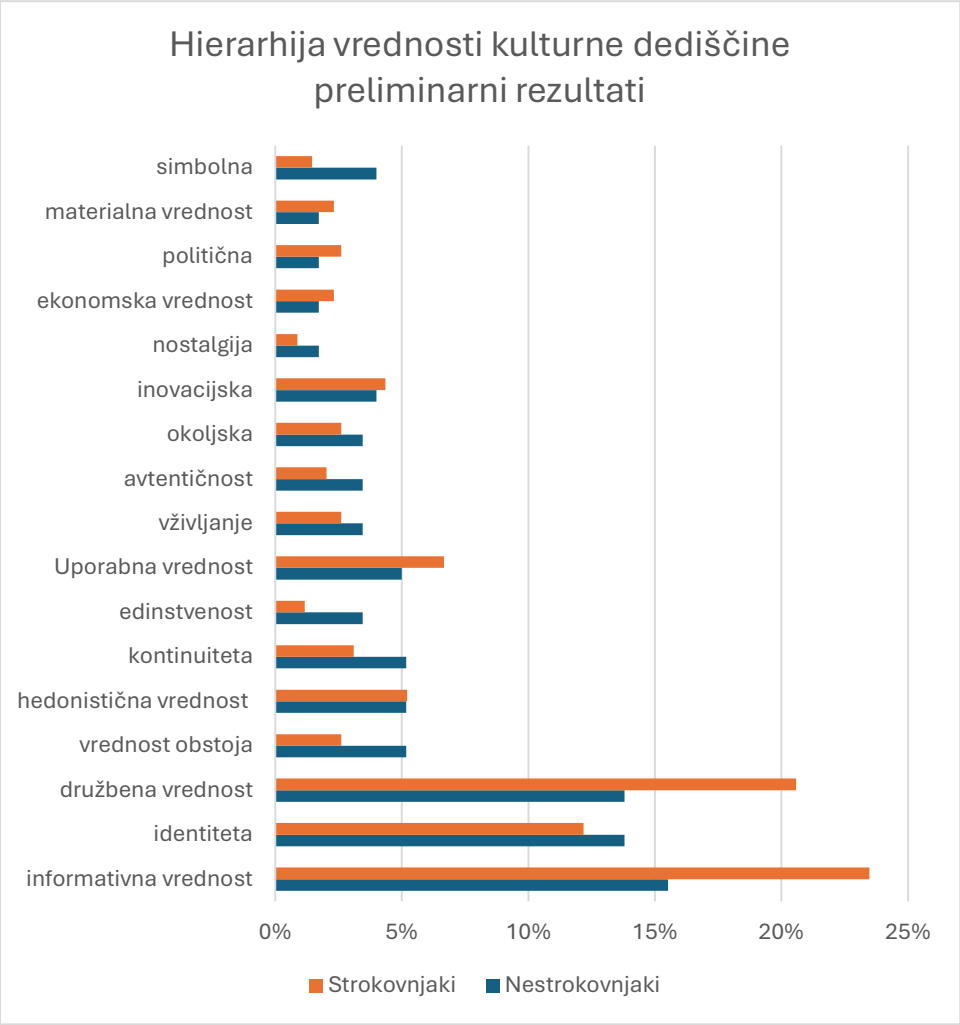

Tabela 1: Preliminarni rezultati kažejo razhajanja pri dojemanju pomena nekaterih vrednosti kulturne dediščine, če primerjamo mnenja strokovnjakov in nestrokovnjakov. / Preliminary results show a divergence in perceptions of the importance of some heritage values when comparing the opinions of experts and non-experts.

Zbrane vprašalnike bomo po uradnem zaključku projekta še dodatno analizirali z naprednimi statističnimi metodami (faktorska analiza) in jih predstavili upravljalcem omenjenih dveh študijskih primerov, da bodo lahko z njihovo pomočjo prepoznane interese ne-ekspertnih deležnikov (javnosti) upošetvali v postopkih upravljanja z dediščino.

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HeriQuest: Perception and Valuation of Cultural Heritage

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The HeriQuest project, which is part of the Eutopia network activities and (RSF) at the University of Ljubljana, brings together 8 students and 3 mentors from four different departments and two faculties of the University of Ljubljana. The interdisciplinary team consists of students and researchers from the Faculty of Chemistry and Chemical Technology and the Faculty of Arts (Departments of Archaeology, Ethnology and Cultural Anthropology, Slavic Studies and Asian Studies).

The project addresses the problem of understanding the different values of cultural heritage and their effective integration into the processes of cultural heritage management. Experts have long recognised that the social value of cultural heritage is not well defined. Some of the values that are common to different stakeholders (experts and non-experts) are embedded in the decision-making and policy-making process. However, there are also values that the non-professional public associates with heritage, but which are not recognised, or not recognised to the same extent, from a professional perspective (Johnston 1992, Smith 2007, Dillon 2013), as heritage protection regulations are often formed from a narrow professional perspective, while societal perceptions are not yet sufficiently researched. The aim of the research was to investigate the perception and valuation of cultural heritage among non-experts and to analyse the differences in perception between experts and the non-experts. In our project, we investigate how non-expert stakeholders perceive and weigh up the different values they ascribe to cultural heritage. Using surveys in two case studies – in Ljubljana's Križanke and in the National Gallery – we are aiming to analyse stakeholders' perceptions on the values they attach to cultural heritage. In the first part of the project, we conducted interviews with eleven experts from various private and public cultural heritage institutions. From the interviews, we extracted the statements that we analysed as part of the focus group. Based on the group's deliberations, we designed a questionnaire for the surveying of non-expert perceptions on heritage. In the second part, we started conducting surveys in two locations. In the National Gallery, we obtained information on how visitors evaluate works of art – movable cultural heritage, and in Križanke we asked the same questions about immovable cultural heritage. After the official completion of the project, the collected questionnaires will be further analysed using advanced statistical methods (factor analysis) and presented to the managers of the two study cases, so that they can use them to take into account the identified interests of non-expert stakeholders (the public) in heritage management procedures.

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25 Vernakularna dediščina na izpraznjenih območjih. Grožnje in dejavniki odpornosti.

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Vernakularna arhitektura je ena najštevilčnejših in najrazličnejših kategorij kulturne dediščine. To pomeni, da je najbolj dostopna vsem državljanom in zato tudi najbolj ogrožena. Po drugi strani pa depopulacija ustreza demografskemu pojavu, ki je na španskem ozemlju najbolj razširjen, saj pokriva več kot polovico geografskega območja države. Glede na oba konteksta se večina vernakularne arhitekture nahaja na območjih, ki jih je prizadel pojav depopulacije, zato lahko grožnje, povezane s tem pojavom, pomenijo tveganje za ohranjanje teh dobrin. To pomeni, da so vernakularne stavbe, za katere je značilna predvsem njihova tradicionalna raba, izgubile svojo prvotno funkcijo, kar je na eni strani privedlo do njihovega opuščanja in postopnega uničevanja, na drugi strani pa do njihovega spreminjanja, da bi jih prilagodili novim potrebam. V španskem kontekstu se je izseljevanje s podeželja začelo na začetku prejšnjega stoletja, zaradi česar se je v desetletjih izselilo več milijonov ljudi, kar je povzročilo resno kulturno krizo. Prebivalci so z odhodom iz vasi s seboj odnesli stoletja znanja, tehnik, prepričanj, poklicev in vrednot. Nekateri od teh elementov so se razvili in ohranili do danes, drugi pa so ostali le v spominu redkih državljanov, ki se spominjajo teh tradicionalnih družb. Raziskava se osredotoča na analizo dejavnikov, ki ogrožajo vernakularno arhitekturo, ki jo je prizadel pojav depopulacije, in odpornost te dediščine, ki lahko spodbuja trajnostni razvoj. Ta raziskava zajema vrsto prečnih tem, ki so povezane z družbeno, kulturno in tehnično naravo arhitekture.

Slika 1: Izguba vernakularne dediščine. Puebla de San Miguel, Valencia, Španija (foto: Eva Tortajada Montalvá). / Loss of vernacular heritage. Puebla de San Miguel, Valencia, Spain. (photo: Eva Tortajada Montalvá).

Vernacular Heritage in Depopulated Territories. Threats and Resilience Factors.

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Vernacular architecture is one of the most abundant and diverse categories of cultural heritage. This situation means that it is the most accessible to all citizens, and therefore the most threatened. On the other hand, depopulation corresponds to the demographic phenomenon of greatest expansion in the Spanish territory, since it covers more than half of the country's geography. Considering both contexts, most vernacular architecture is located in the territories affected by the phenomenon of depopulation, so that the threats associated with this phenomenon may pose a risk to the conservation of these assets. This situation means that vernacular buildings, characterised mainly by their traditional uses, have lost their original function, which has led to their abandonment and progressive destruction on the one hand, and on the other, to their modification to adapt them to new needs. In the Spanish context, the rural exodus began at the beginning of the last century, resulting in the displacement of millions of people over the decades, which led to a serious cultural crisis. In leaving the villages, the inhabitants took with them centuries of knowledge, techniques, beliefs, trades and values. Some of these elements have evolved and been preserved to the present day, others, however, remain only in the memory of the few citizens who remember those traditional societies. The research focuses on analysing the factors which pose a risk to vernacular architecture affected by the phenomenon of depopulation and this heritage's resilience able to promote a sustainable development. This research covers a series of transversal themes that are related thanks to the social, cultural and technical nature inherent to architecture.

26 Družbena omrežja kot vektorji za promocijo nesnovne kulturne dediščine Maroka: vprašanja in perspektive

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Maroška nesnovna kulturna dediščina (NKD), vključno z glasbo, poezijo, tradicijami in obrtmi, se v digitalni dobi sooča z izzivi prenosa. Družbena omrežja ponujajo nove priložnosti za njeno promocijo in varovanje. Ta prispevek preučuje, kako te digitalne platforme prispevajo k razširjanju maroške NKD, ter analizira njihov vpliv na njeno ohranjanje in dostopnost.

Študija temelji na vsebinski analizi objav na družbenih omrežjih (Facebook, Instagram, YouTube, TikTok). Cilj je opredeliti vrste vsebin, ki se najpogosteje uporabljajo za promocijo NKD, kot so izobraževalni videoposnetki, slike in digitalne zgodbe.

Rezultati kažejo, da imajo družbena omrežja ključno vlogo pri promociji maroške NKD, saj omogočajo njeno prepoznavnost in prenos. Avdiovizualne platforme, kot sta YouTube in TikTok, omogočajo razširjanje tradicionalnega znanja v dostopnih in zanimivih oblikah. Vendar pa standardizacija in komoditizacija nekaterih kulturnih praks sprožata vprašanja o njihovi pristnosti. Poleg tega se pobude posameznikov (umetnikov, ustvarjalcev vsebin) izkazujejo za vplivnejše od institucionalnih strategij, ki jih pogosto omejuje pomanjkanje prilagajanja novi digitalni dinamiki.

Zdi se, da so družbena omrežja bistvena orodja za spodbujanje maroške NKD, čeprav ostajajo izzivi v smislu pristnosti in institucionalne zavezanosti. Ta študija poudarja pomen ustreznih digitalnih strategij in utira pot prihodnjim raziskavam o vplivu novih tehnologij (virtualna resničnost, umetna inteligenca) na ohranjanje kulturne dediščine.

Social Networks As Vectors For Promoting Morocco's Intangible Cultural Heritage: Issues And Prospects

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Morocco's intangible cultural heritage (ICH), including music, poetry, traditions, and crafts, is facing transmission challenges in the digital age. Social networks offer new opportunities for its promotion and safeguarding. This article examines how these digital platforms contribute to the dissemination of Moroccan ICH and analyzes their impact on its preservation and accessibility.

The study is based on a content analysis of publications on social networks (Facebook, Instagram, YouTube, TikTok). The aim is to identify the types of content most commonly used to promote ICH, such as educational videos, images, and digital stories.

The results show that social networks play a key role in promoting Moroccan ICH by facilitating its visibility and transmission. Audiovisual platforms such as YouTube and TikTok enable the dissemination of traditional knowledge through accessible and engaging formats. However, the standardization and commoditization of certain cultural practices raise questions about their authenticity. Moreover, individual initiatives (artists, content creators) are proving more influential than institutional strategies, which are often limited by a lack of adaptation to new digital dynamics.

Social networks appear to be essential tools for promoting Moroccan ICH, although challenges remain in terms of authenticity and institutional commitment. This study highlights the importance of appropriate digital strategies, and paves the way for future research into the impact of emerging technologies (virtual reality, artificial intelligence) in the preservation of cultural heritage.