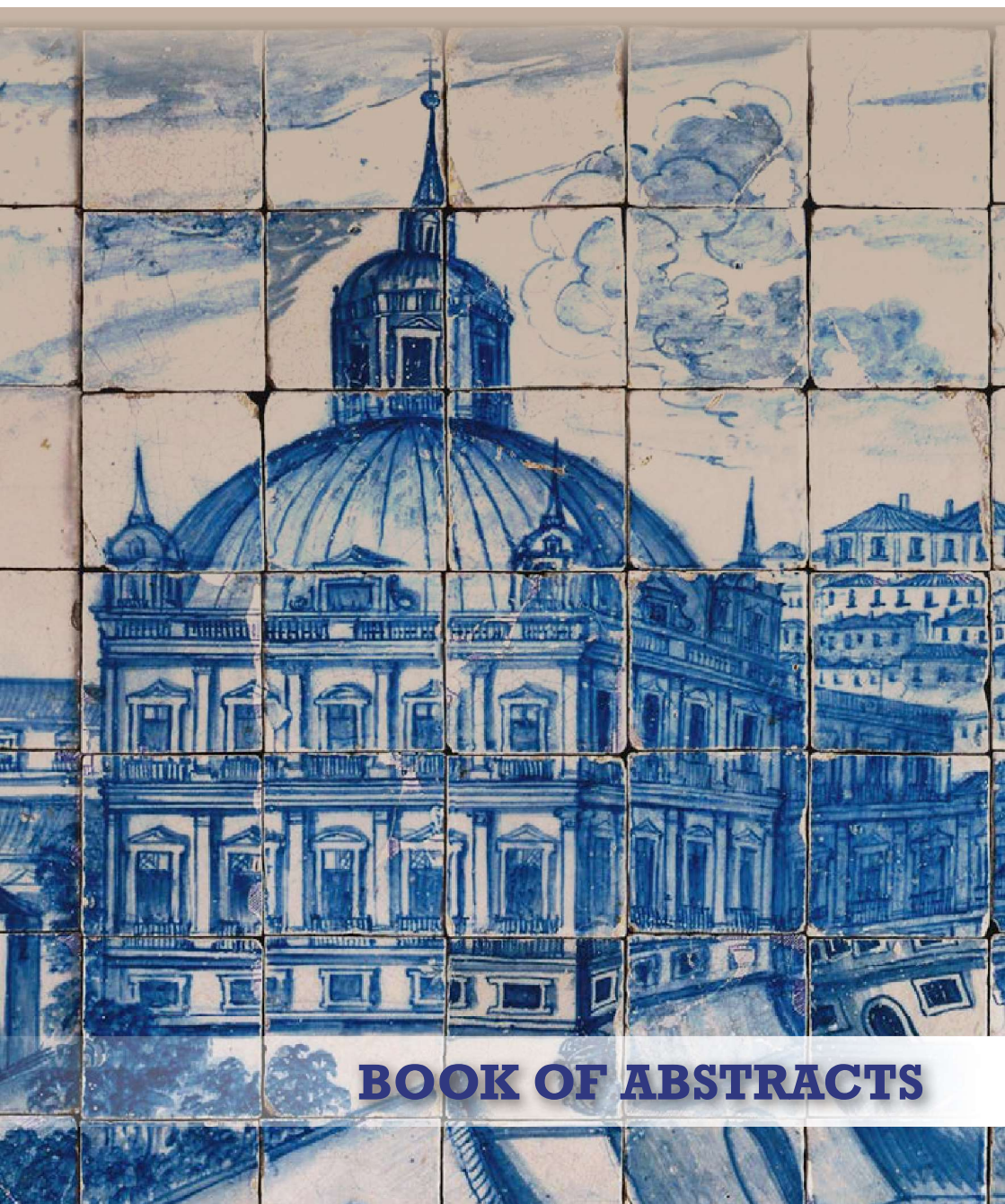




International conference  
on analytical techniques  
in art and cultural heritage  
**LISBON | 07-12 MAY**



**BOOK OF ABSTRACTS**

# TECHNICAL INFORMATION

## TECHNART2023 BOOK OF ABSTRACTS

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30	<u>Paolo Antonino Maria Triolo</u>	<i>Implementation of the diagnostic capabilities of the CMOS sensor in the NIR environment, using 1070nm interference filter and a conventional band-pass filters set</i>	5103
31	<u>Patrícia Gatinho</u> , Cátia Salvador, Sílvia Macedo Arantes, M. Rosário Martins, Amélia M. Silva, Ana Z. Miller and A. Teresa Caldeira	<i>Prospection of bioactive compounds produced by bacterial isolates from pristine environments</i>	5368
32	<u>Marta Porcaro</u> , Antonio Brunetti, Anna Depalmas, Carlo Casi, Rosario Maria Anzalone and Caterina De Vito	<i>Use of X-ray fluorescence combined with Monte Carlo simulation for determination of bronze alloys</i>	799
33	<u>N.K. Kladouri</u> , S. Skaltsa, Th. Gerodimos, K. Pezouvani and A.G. Karydas	<i>Compositional <math>\mu</math>-XRF analyses of copper-based coins from Rhodes, Greece, 4th c. BCE to 2nd c. CE</i>	9750
34	<u>Isabel Amaya-Torres</u> , Constanza Acuña, Valeria Godoy, Karla Leiva, Rosalía Astorga	<i>Climate data analysis for sustainable conservation of cultural heritage</i>	2004
35	<u>Ada Sáez</u> , Mónica Álvarez de Buergo, Natalia Pérez-Ema	<i>Portable non-destructive techniques applied to the study of the deterioration pattern of partially submerged heritage in reservoirs</i>	2576
36	<u>Maria Kylafi</u>	<i>The Pylos Geoarchaeological Program: Fusion of Images towards understanding Ancient Landscape</i>	8955
37	<u>Maria Zdończyk</u> , Barbara Tydzba-Kopczyńska, Joanna Cybińska	<i>Luminescent coatings for the anti-theft protection of cultural heritage glass and metal objects</i>	2026
38	<u>Vanessa Antunes</u> , Jorge Machado, Marluce Menezes, Carla Tomás, José Cruz, Gunnar Liestol, João Serra	<i>Collaborative Efforts in Preserving Cultural Heritage: The "Forte das Memórias" Project</i>	6365
39	<u>Cátia Salvador</u> , Sílvia Macedo Arantes, M. Rosário Martins, António Candeias, Cesareo Saiz-Jimenez and A. Teresa Caldeira	<i>Microbial communities of underwater caves from Algarve coast: Biological activities prospection</i>	686
40	<u>Jorge Sanjurjo Sánchez</u> , Carlos Arce Chamorro, Adolfo Fernández Fernández, Alves Carlos, Jose Carlos Sánchez-Pardo and Rebeca Blanco-Rotea	<i>Geophysical survey using gamma ray spectrometry (GRS) on the archaeological site of Cidadela (Galicia, NW Spain)</i>	4901
41	<u>Iñaki Vázquez de la Fuente</u> , Inés Barbier, Sara Puente Muñoz, Nagore Prieto Taboada, Gorka Arana and Juan Manuel Madariaga	<i>Natural materials for cleaning metallic leachates (based on iron and copper) on marble surfaces as alternative of traditional gels</i>	5521
42	<u>Tomas Trojek</u> , Pavel Novotny, Martin Hlozek and Darina Trojkova	<i>X-ray fluorescence imaging with benchtop devices for scanning and full field techniques</i>	9984
43	<u>Martina Romani</u> , Erlantz Lizundia and Maite Maguregui	<i><math>\mu</math>-EDXRF imaging to evaluate desalination ability of cellulose foams and sponges applied on wall paintings</i>	8794
44	<u>Nouchka De Keyser</u> , Frédérique Broers, Annelies van Loon, Francesca Gabrieli, Frederik Vanmeert, Steven De Meyer, Arthur Gestels, Victor Gonzalez, Petria Noble, Koen Janssens and Katrien Keune	<i>Pararealgan and semi-amorphous arsenic sulfides discovered in Rembrandt's Night Watch</i>	3922
45	<u>Joanna Zwinczak</u> , Krzysztof Kruczała and Marek Bucki	<i>Retouches of the paint layer: Research into physical and chemical changes of the materials used in conservation studios in the National Museum in Kraków</i>	3956
46	Maria Antonia Garcia, <u>Consuelo Imaz</u> , Pedro Pablo Perez and Ana Albar	<i>GUADAMECI ALTARPIECE : A CASE OF STUDY EMPLOYING DIFFERENT ANALYTICAL METHODOLOGIES</i>	3969
47	<u>Simona Raneri</u> , Giulia Lorenzetti, Vincenzo Palleschi, Simonetta Rota, Beatrice Meriadri, Stefano Legnaioli	<i>The 'Madonna delle Grazie' of Andrea del Sarto/ Giovanni Antonio Sogliani: a multi-analytical study</i>	6948
48	<u>Fiona McNeill</u> , Taren Ginter, Megan Gallagher, Shaelyn Horvath, Josephine La Macchia, Sonia Marotta	<i>The toxicity of historical white lead makeup</i>	7166
49	<u>Milene Gil</u>	<i>Analytical study of the powdered pigments collection from the Brazilian artist Gilda Neuberger (1911-2011)</i>	7307
50	<u>Mariangela Cestelli Guidi</u> , Fabio Aramini, Antonella Balerna, Silvia Brandalesi, Giuseppe Bonifazi, Giuseppe Capobianco, Elisabetta Giani, Eleonora Gorga, Marcella loele, Barbara Lavorini, Alice Mantoan, Lucilla Pronti, Martina Romani, Silvia Serranti, Vittorio Sciarra, Mauro Simeone, Stefano Tamascelli, Gianluca Verona Rinati, Giacomo Viviani	<i>ARTEMISIA: artificial intelligence to support diagnostic technologies for Cultural Heritage. An integrated multi-modal approach for assessing the state of conservation of pictorial works.</i>	7316

# Microbial communities of underwater caves from Algarve coast: Biological activities prospection

Cátia Salvador <sup>(1)</sup>, Sílvia Macedo Arantes <sup>(1)</sup>, M. Rosário Martins <sup>(1,2)</sup>,  
António Candeias <sup>(1,3,4)</sup>, Cesareo Saiz-Jimenez <sup>(5)</sup>, A. Teresa Caldeira <sup>(1,3,4)</sup>

(1) *HERCULES Laboratory, Institute for Advanced Studies and Research, University of Évora, Largo Marquês de Marialva 8, 7000-809 Évora, Portugal*

(2) *Department of Medical and Health Sciences, School of Health and Human Development, University of Évora, Évora, Portugal.*

(3) *Department of Chemistry and Biochemistry, School of Sciences and Technology, University of Évora, Rua Romão Ramalho 59, 7000-671 Évora, Portugal*

(4) *City U Macau Chair in Sustainable Heritage, Institute for Advanced Studies and Research, University of Évora, Largo Marquês de Marialva 8, 7000-809 Évora, Portugal.*

(5) *Instituto de Recursos Naturales y Agrobiología de Sevilla (IRNAS-CSIC), Avenida Reina Mercedes 10, 41012 Sevilla, Spain.*

Microorganisms are known to be an important source of bioactive compounds. Lately, the microbiota of hypogenic environments, such as underwater caves, has been explored, since they constitute complex ecosystems, which bring unique conditions for the development of organism's niches with unknown biodiversity. These microorganisms may have interesting characteristics regarding the high potential to produce new bioactive compounds with antitumoral, antioxidant, antimicrobial and pesticide properties, with potential application in Cultural Heritage safeguarding [1-2].

This study under the PROBIOMA project aims to search for new bioactive compounds produced by bacterial cultures, isolated from marine caves. Samples were collected in two underwater caves on the Algarve coast and microbial biodiversity was assessed by High-throughput sequencing and cultivable microorganisms were isolated on marine agar medium 2216 [3].

Metagenomics showed mostly bacteria from the *Proteobacteria*, *Bacteroidetes* and *Firmicutes* phyla. DNA of 269 selected bacterial isolates was extracted and the identification was performed by sequencing 16SrDNA. Antimicrobial spectra of metabolites produced by selected isolates (*Brevibacterium* sp., *Pseudoalteromonas* sp., *Vibrio* sp., *Cobetia* sp., *Cellulophaga* sp., *Tenacibaculum* sp., *Bacillus* sp., *Mesonina* sp., *Rhodobacteraceae* sp., *Agarivorans* sp. and *Sulfitobacter* sp.) was evaluated in solid and liquid media against bacterial strains of *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli* and *Pseudomonas aeruginosa*, and in solid medium against biodeteriogenic fungi *Mucor* sp., *Aspergillus niger*, *Fusarium oxysporum*, *Cladosporium* sp., and two *Penicillium* sp.. On the other hand, supernatants of cultures from selected isolated bacterial strains were screened for evaluation of antitumor potential against breast cancer epithelial cell line MDA-MB-231 [4]. Direct supernatants (without prior concentration) did not show significant antifungal action against the selected fungal strains. However substantial antibacterial activity was observed in direct supernatants of *Brevibacterium* sp., *Pseudoalteromonas* sp., *Vibrio* sp. and *Sulfitobacter* sp.. Additionally several supernatants of selected strains showed high antiproliferative activity against this breast tumour cell line, namely *Sulfitobacter*, *Cobetia* and *Pseudoalteromonas*.

Overall, there were some very promising results concerning the prospection of new biocompounds with biological properties obtained from microbial communities of underwater caves from Algarve coast, constituting new potential for green-safe and sustainable solutions and representing an opportunity for the valorization of these Natural, Genetics and Cultural Heritage.

**Keywords:** Natural, Genetics and Cultural Heritage; Underwater caves; hypogenic environments; Microbiota; Biological compounds; Green-safe and sustainable solutions

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