

CULTURAL AND ENVIRONMENTAL HERITAGE

Section "PhD positions and scholarships" integrated on 21/04/2020

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Starting date of the PhD Programme	01/11/2020			
Duration	3 calendar years			
Language of the PhD Programme	Italian and English			
Mandatory stay abroad	No			
Curricula	Research topics			
A) Cultural and environmental heritage: memory, protection, rights	<ol style="list-style-type: none"> Cultural heritage: Historic, social, economic, and cultural processes in European, Mediterranean, and Western Asian contexts; public history; conservation of ethno-cultural heritage and management of cultural resources in endangered areas. Environment, objects and rights; diagnostic analysis of monumental and portable artefacts of historical interest; musealisation through digital and virtual modelling; promoting the appreciation and use of bio-environmental goods as common goods; legal and regulatory consequences. Environment and landscape, cities and architecture: tools for the analysis and conservation of the environment, biological and anthropological heritage, archaeology, urban settings, industrial archaeology, consolidation and restoration of historical architecture; the historical relationship between urban areas and their territories, sustainable development of tourism, fruition of historic towns. Governance and management of common goods: risk assessment and risk management, efficient use of resources, definition and quantification of ecosystemic service value, assessment of natural resource consumption and of production of solid, liquid, and gaseous waste. 			
B) Science and Technologies for Cultural Heritage	<p>Production techniques, material characterization, state of conservation. Development of: advanced analytical protocols (spectroscopy, immune chemistry, DFT, chemometrics), micro and non-invasive diagnostic methods, intervention methods on humidity phenomena of historical buildings, interaction with pollutants, tomographic systems (digital radiography, X-Ray computer tomography, software for real-time tomography and 3D rendering. Development of innovative restoration materials and methods. Design, development, testing and performance evaluation of innovative materials (nanomaterials, polymers, biopolymers, composite materials) and methods for the consolidation, cleaning and protection of both movable and immovable cultural heritage. Survey, monitoring and representation technologies: definition of protocols and standards for the production of 3D contents aimed at monitoring cultural heritage, methods and protocols for the production of 3D models with semantic structure to be applied to cognitive systems, design of web-based application for the archiving and use of technical-scientific data related to conservation and restoration projects, production contents and design of augmented reality systems, efficient workflows, survey and monitoring multiscale integrated techniques integrated by topographic, photogrammetric, laser scanner and special positioning, UAV survey for data management, acquisition with multispectral sensors and scanners, GIS applications, 3D models (development of new procedures for the collection and optimal elaboration, ICT methodologies and techniques for the creation, analysis and representation (virtual reality and augmented/mixed reality) and multi sensorial interaction by means of digital data.</p>			
PhD positions and scholarships				
Position n.	Financial support	Description	Curriculum	Positions linked to research subjects
1	PhD Scholarship	Totally funded by the University of Bologna	Curr. A	The circulation of books and libraries through the academies during the

		general budget		16th and 17th centuries
2	PhD Scholarship	Totally funded by the University of Bologna general budget	Curr. A	The measure of the past: metrology and weight units in the Phoenician and Punic Mediterranean, between the Levant and the classical world
3	PhD Scholarship	Totally funded by the University of Bologna general budget	Curr. A	For a multidisciplinary legal approach to material and immaterial cultural heritage: international, regional and internal context
4	PhD Scholarship	Totally funded by the University of Bologna general budget	Curr. A	The principle of sustainable development in the constitutional order
5	PhD Scholarship	Totally funded by the University of Bologna general budget	Curr. A	Modeling saltwater contamination of aquifers in coastal wetlands through the integration of airborne geophysical data (airborne electromagnetics) with satellite data and hydro-geologic models
6	PhD Scholarship	Totally funded by the University of Bologna general budget	Curr. A	Italian Judaism between the Middle Ages and the Modern Period in the light of its manuscripts
7	PhD Scholarship	Totally funded by the University of Bologna general budget	Curr. A	The persistence of classical mythology in medieval and humanistic culture
8	PhD Scholarship	Funded by the University of Bologna general budget and co-funded by the Department of Cultural Heritage with funds made available by the project PRIN Settore LS8 Linea A - codice 20177PJ9XF_004 (Prof.ssa Luiselli)	Curr. A	Biological and cultural heritage of seapeople
9	PhD Scholarship	Funded by the University of Bologna general budget and co-funded by the Department of Cultural Heritage with funds made available by the project ADRIACOST (Prof.ssa Airoldi) and the Macquaire University (Australia)	Curr. A	Ecosystem functions and services of restored salt marshes in urban seascapes
10	PhD Scholarship	Funded by the Department of Cultural Heritage with funds made available by the project ERC n.772544 H2020 – project IMPACT HAU (Prof. Brightman)	Curr. A	Anthropology of Impact Investing and Global Health
11	PhD Scholarship	Funded by the Department of Cultural Heritage with funds made available by the project ERC n.772544 H2020 – project IMPACT HAU (Prof. Brightman)	Curr. A	Anthropology of Impact Investing and Migration
12	PhD Scholarship	Funded by the Department of Cultural Heritage with funds made available by the project Urban Innovative Actions (UIA) - PROGETTO DARE (Prof.lannucci)	Curr. A	Digital Heritage tools for the communication and enhancement of the Darsena district in Ravenna
13	PhD Scholarship	Funded by the Department of Cultural Heritage, partly with funds made available by the project ERC n. 724046 H2020 – project SUCCESS (Prof. Benazzi)	Curr. A	Individual human biological life history reconstruction through dental enamel analysis

14	PhD Scholarship	Funded by Fondazione Flaminia	Curr. A	Digital Heritage tools for the communication and enhancement of the Darsena district in Ravenna
15	PhD Scholarship	Funded by the University of Bologna general budget and co-funded by the Department of Cultural Heritage, partly with funds made available by CIRI ICT	Curr. B	Computer Science for the interpretation and valorisation of scientific data acquired on artistic and historical objects
16	PhD Scholarship	Funded by the University of Bologna general budget and co-funded by the Department of Chemistry "G. Ciamician" with funds made available by the project ERC n. 803147 - Resolution (Prof. Talamo)	Curr. B	Accurate radiocarbon dating on shells
17	PhD Scholarship	Funded by Romagna Acque - Società delle Fonti S.p.A.	Curr. A	The Romagna Acque Società delle Fonti S.p.A. archive: between tradition and innovation. A census, inventory and enhancement project.

Positions with scholarship linked to specific topics: each position is reserved for one of the two Curricula of the PhD Programme and focused on the development of a specific research subject, a detailed description of which can be found at the bottom of this document. The available positions will be awarded taking into account the research subject and curriculum for which the applicant has expressed his/her preference, as indicated in the cover page of the multi-annual research project.

Should positions linked to specific research subjects remain vacant or there should be positions linked to specific research subjects for which no candidate has expressed interest, they will be proposed to eligible applicants within the same Curriculum, who have achieved the highest score.

Admission requirements

Please, see art. 2 of the Call for applications

Mandatory documents to be attached to the application

Please, see art. 3 of the Call for applications

Further qualifications that may be attached to the application, if in possession of the applicant (only qualifications attested by documents drawn up in Italian, English, French, German and Spanish shall be considered as valid and assessed by the Admission Board)

- Abstract of the second cycle master's degree thesis. Undergraduate applicants may submit the draft of the thesis approved by their supervisor (please, note that abstracts cannot exceed 5.000 characters, including spaces and formula possibly used. The above figure does not include: the title of thesis, the outline, and images such as graphs, diagrams, tables etc. - where present);
- No more than 2 reference letters signed by Italian and international academics and professionals in the research field, which do not form part of the Admission Board, attesting the suitability of the applicant and his/her interest for the scientific research.
Please, note that the above letters cannot be uploaded by applicants. When filling the online application form on <http://studenti.unibo.it>, applicants will only be allowed to provide the email accounts of the requested academic/professional. The latter shall receive an email from the University of Bologna providing for the instructions for uploading. Only letters in pdf format submitted before the expiry date and time of the Call shall be accepted.
- Multi-annual research project, with special emphasis on the activities to be completed during the first-year course. The proposal must meet the following requirements:
 - o It must indicate in the cover page the curriculum of the PhD Programme and the research subject covered by the research project proposal and for which the applicant is applying (in the absence of this information, the project proposals will be given a zero score);
 - o It cannot exceed 20.000 characters, including spaces and formula possibly used. This figure does not include: the title of project, the outline, references and images (such as graphs, diagrams, tables etc - where present);
 - o It must include: the state of the art; description of the project; expected results; lead-time for implementation; (proposed) criteria to be used to assess the findings obtained; references.

The research projects that successful applicants shall carry out during their doctoral career may possibly differ from the project proposed at the application stage. This shall be defined together with the supervisor and approved by the Academic Board.
- List of the publications (monographs, articles published on scientific journals, volume's chapters).
- List of the abstracts and posters presented during national and international conferences, etc.
- Professional Master courses completed in Italy (1st or 2nd level) relevant to the PhD Programme.
- Postgraduate vocational training programmes/specialisation programmes relevant to the PhD Programme.

- Thesis defended within the framework of Specialization Schools.
- Teaching activity carried out at university level.
- Research activity of any kind - whether basic, applied, translational, etc. - carried out in any capacity, including when covered by research grants, and as a staff member of research projects.
- Vocational internships
- Curricular and non-curricular training and guidance internships
- Documents attesting the knowledge of foreign languages
- Study periods completed by students outside their countries of origin (e.g. Erasmus programme or other similar mobility programmes)
- Other qualifications attesting the suitability of the applicants (scholarships, prizes, etc)

Admission exams (art. 4 of the call for applications)

Examination type	Schedule (please, note that applicants shall not receive any communication concerning the exams schedule)	Examination results publication (please, note that applicants shall not receive any communication concerning the publication of results)
Qualifications and research project evaluation	Non-presential.	The results of the qualifications and research project evaluation shall be available online starting from the 02/06/2020 at the page http://studenti.unibo.it (please, select: "summary of the requests in progress" - "see detail" and open the pdf file "risultati valutazione titoli e progetto")
Oral examination	Date	The results of the oral examination shall be available on the webpage http://studenti.unibo.it starting from 02/07/2020 (please, select "summary of the requests in progress" - "see detail" and open the pdf file "risultati prova orale")
	Time	
<p>18/06/2020 In case that the oral examination cannot be completed in one day due to the large number of applicants, the oral exam schedule shall be made available at the webpage http://studenti.unibo.it together with the results of the qualifications and research project evaluation</p> <p>10:30 a.m. (local time)</p> <p>Applicants shall take the exam remotely. For further details please refer to the relevant provision laid down in art. 4 of the Call for applications.</p>		

Evaluation criteria

Points will be allocated to applications out of a total of 100 on the basis of the following weighting:

1. Qualifications and research project

- Minimum for admission to the oral exam: 30 points
- Maximum: 50 points

Only qualifications relating to the last 5 calendar years prior to the calendar year of publication of the Call for applications shall be taken into consideration, with the exception of the University Degree (Diploma di laurea). Please, note that qualifications must be consistent with the PhD Programme.

Points relating to qualifications shall be allocated on the basis of the following criteria:

- Graduation final mark. Undergraduates shall be evaluated on the basis of the Weighted Average Mark (WAM): max 15 points
- Publications: max 5 points
- Other relevant qualifications indicated in Curriculum Vitae: max 5 points

Points relating to the research project shall be allocated on the basis of the following criteria:

- Scientific value and ground-breaking nature of the proposal: max 15 points
- Description and structure of the proposal: max 5 points
- Proposal feasibility: max 5 points

2. Oral examination

- Minimum for inclusion in the final ranking list :30 points
- Maximum: 50 points

Oral examination includes the presentation of the research project and is intended to assess the suitability of the applicant to pursue scientific research as well as the general knowledge of issues connected to the PhD Programme. During the oral examination, knowledge of English language shall be assessed.

The oral examination is carried out in Italian or in English.

Points relating to the oral examination shall be allocated on the basis of the following criteria:

- knowledge of the English language: max 5 points
- research project presentation: max 25 points
- general knowledge of issues connected to the PhD Programme: max 20 points

Possible evaluation sub-criteria will be available on the [Unibo website](#), selecting the relevant PhD Programme → "PhD programme information" at the bottom of the page in the section "Notices".

Final ranking list and enrolment (arts.6 and 7 of the Call for applications)

After the publication of the results of the oral exam, the final ranking list will be available on the [Unibo website](#), selecting

the relevant PhD Programme → “PhD programme information” at the bottom of the page in the section “Notices”. Following the publication of the final ranking list, successful applicants must enroll on <http://studenti.unibo.it> by the deadline indicated on the [Unibo website](#), selecting the relevant PhD Programme → “PhD programme information”.

Research topics for the PhD in Cultural and Environmental Heritage – 36th cycle Curriculum A

1) The circulation of books and libraries through the academies during the 16th and 17th centuries

(Totally funded by the University of Bologna general budget)

Since the 1540's, the academies take shapes, structures and purposes increasingly clear and defined. Widely developed both in Italy and in the major European countries, the academies were able to set up an extensive network of transnational connections which were significant and effective from the perspective of the communication, the sharing and the circulation of ideas. This doctoral research project intends to focus on the aspects of the circulation and the development of the book collections inside the Italian academies, in particular with regard to the institutions founded in the 16th century, which represent a reality as complex from an historical and cultural point of view as little studied compared to the following centuries. In view of the study, the production, the use and the circulation of books, it will be particularly appreciated a thorough examination of the connection between the handwritten book and the printed book, as well as a project of enhancement and cataloguing of a library of specific interest will be positively evaluated.

2) The measure of the past: metrology and weight units in the Phoenician and Punic Mediterranean, between the Levant and the classical world

(Totally funded by the University of Bologna general budget)

Like other urban civilizations, Phoenicians and Carthaginians also employ a conventional system of weights and measures, which is indispensable to guarantee stability to forms of organized coexistence. In the Levant the criteria for linear measurement are elaborated starting from intuitive concepts, such as the correspondence with body parts, and built on the basis of models already tested in Mesopotamia and Ancient Egypt. At present, metrology studies applied to Phoenician and Punic archaeological emergencies are limited to a few architectural contexts. Similarly, the weight system appears to be reconstructible only in part, for example in the numismatic field or thanks to the discovery of a few artefacts, in metal and stone, interpreted as weights. Moreover, the system of correspondence between linear and ponderal values and the symbology plausibly used to indicate them remains obscure. Finally, the data seem to be lacking with respect to the objective of verifying whether and in what percentage the Eastern metrological tradition persists, particularly in Central-Mediterranean area, after the Romanization of Punic settlements in North Africa, Sicily and Sardinia.

3) For a multidisciplinary legal approach to material and immaterial cultural heritage: international, regional and internal context

(Totally funded by the University of Bologna general budget)

Starting from the second half of the twentieth century, the protection of cultural heritage in all its manifestations, tangible and intangible, became a matter of primary juridical importance, at national as well as international level. The concept of cultural heritage itself, within the national, supranational and international legal sources, has acquired, over the years, new and deeper meanings, overcoming the material dimension of the asset to bring out the value of heritage as an instrument and expression of cultural identity of peoples.

Therefore, the need to protect and promote cultural heritage in all its multiple aspects makes it necessary a multidisciplinary legal approach to its study, especially in light of the natural, historical and social events that represent a risk for its integrity, and in light of the relevant current national, supranational and international legal framework. In this regard, it will be examined, in particular, the destruction or risk of damage, the illicit removal and trafficking of cultural heritage in the context of international conflicts and beyond, and the answer given so far by relevant law and public actors, assessing their adequacy and critical aspects, and providing solutions to deal with the latter. A solid legal preparation from the candidate is required.

4) The principle of sustainable development in the constitutional order

(Totally funded by the University of Bologna general budget)

Starting from the Brundtland report (also known as Our Common Future), published in 1987 by the World Commission on the Environment and Development (WCED), the concept of sustainable development has been built around the idea that economic development is sustainable if it meets present needs without compromising the rights of future generations. The political and sociological dimension of sustainable development has been accompanied by a progressive legal recognition of the concept, thanks to a variety of legislation adopted at international (the so-called 2015 Paris Agreement), supranational (articles 3.3 TEU and 37 CDFUE) and national level (Article 3-querter of Legislative Decree No. 152/2006, Environmental Code, which expressly qualifies sustainable development in terms of the general principle of environmental action). Despite these trends, several points remain to be clarified and consolidated. For example, the prescriptive scope of the principle remains uncertain and its constitutional value doubtful, although some provisions of the Constitution seem, at least implicitly, to refer to it. The research project aims at focussing on legal dimension of the concept of sustainable development, in order to verify whether it is possible to develop it into a unitary morphology and a coherent foundation, starting from the constitutional level, in comparison with other legal systems. To this end, it is requested to reconstruct the state of the art, through the identification of the legal sources (and their respective position in the hierarchy of legal sources) that define the principle, and through the study of the role of case-law and practices (at international, supranational and constitutional level) in outlining its content. The research project should then put forward a unitary legal definition of the concept of sustainability, systematically rooted in the constitutional text, and investigate its potential, trying to identify, within the legal system: a) new

subjective legal claims; b) a general principle of sustainability of constitutional rights, also with a view to their respective balancing; c) a possible limit to legislative discretion, which can be translated into a duty of intergenerational solidarity.

5) Modeling saltwater contamination of aquifers in coastal wetlands through the integration of airborne geophysical data (airborne electromagnetics) with satellite data and hydro-geologic models
(Totally funded by the University of Bologna general budget)

Almost 2.5 billion people live within 100 km from the coastline and this value is constantly increasing. The large majority of the world river deltas and coastal wetlands are undergoing a progressive salinization of both surface- and ground-waters mainly due to natural processes and anthropic activities. The current accelerated sea level rise caused by global warming is already decreasing the availability of freshwater at many coastal sites worldwide. Moving from these considerations, the research aims at developing a methodology suitable for a comprehensive multi-scales characterization of the salinization processes affecting river deltas and coastal wetlands over large territories. The method envisioned for the research is based on the integration of satellite and airborne data collected with passive and active sensors with field hydro-geological observations. Thanks to recent advancements of the airborne geophysical technologies, and specifically of Airborne Electromagnetics (AEM), it is now possible to retrieve a 3D model of the near-surface electrical conductivity at very high spatial resolution over large areas. The project aims at re-using AEM data already acquired for other purposes (e.g. commercial) along coastal areas around the world. These data sets opportunely re-processed can be used to focus on near-surface aquifer systems, allowing the detection of saltwater intrusion. Results will be integrated with the analyses of satellite data with the purpose of developing radiometric indexes (e.g. vegetation indexes) that can indicate and track the soil and water salinization. The results of the project will be useful for monitoring and management purposes of coastal areas, deltas and wetlands. The candidate will take part into the PhD program in Cultural and Environmental Heritage funded by the Department of Cultural Heritage (DBC) of the University of Bologna. The candidate will work at the CIRSA center, Ravenna Campus, but the program will include visiting periods at other locations and abroad.

6) Italian Judaism between the Middle Ages and the Modern Period in the light of its manuscripts
(Totally funded by the University of Bologna general budget)

The role of Italy has been predominant in the production of Jewish and Hebrew cultural heritage, in particular of manuscripts, calculating that over fifty percent of those today preserved in libraries and archives around the world come from Italy. This happens because they are produced in it, or were brought to our peninsula by Jews expelled from Spain, France and the German area, or again, because they bear censorship subscriptions from censors operating in Italy. This figure is impressive, if we observe that the Jewish population of the Italian peninsula, which dates back to a few decades before the beginning of the CE, never exceeded 40 / 50,000 souls. Italian Judaism played a fundamental role for all world Judaism, not only for the Hebrew manuscripts, but also for the Hebrew press, born in our peninsula where the first incunabula were printed. The guideline of this research is to study the Italian book production of the Jews, the "people of the book".

7) The persistence of classical mythology in medieval and humanistic culture
(Totally funded by the University of Bologna general budget)

With the advent of Christianity, pagan gods do not disappear from the culture of medieval Europe, but remain concealed. The importance of classical mythology during the Renaissance is well known, but recently we understood how much the Greek and Latin myths didn't disappear in the Middle Ages and in Humanism. Now we must study the relationships between the artistic phenomenon and everyday life: ancient deities have to be found in the objects and rites of Christian Europe, in the relationship of the faithful with the divinity and its manifestations on earth. In the 14th century, when Giovanni Boccaccio wrote the Genealogy of pagan gods – the height of the medieval tradition and the beginning of the humanistic one – the stories, objects and attributes of each deity come to light: therefore, an entire system of symbols re-emerges. It has its roots in antiquity, but it is formed and consolidated when the gods of Olympus continue to live, in other forms, on earth.

8) Biological and cultural heritage of sea peoples
(Funded by the University of Bologna general budget and co-funded by the Department of Cultural Heritage with funds made available by the project PRIN Settore LS8 Linea A - codice 20177PJ9XF_004 - Prof.ssa Luiselli)

Human interaction with the Mediterranean Sea has a long history, which tells of the particular importance of the prehistoric period of coastal areas as a source of resource supply, the centrepiece of the social development of entire communities, but also a starting point for those migratory processes that have allowed the spread of peoples and cultures throughout the continent. Through a multidisciplinary research approach, this project aims to investigate and understand the genetic heritage and diffusion dynamics of the biological and cultural heritage of past sea populations. Specifically, the proposed line of research aims to analyse from a geographical and diachronic perspective the legacy of sea populations and related fishing activities, generating paleogenomic and metagenomic data for an integrated model of analysis in historical, cultural and archaeological contexts well documented by ecofacts and artifacts.

9) Ecosystem functions and services of restored salt marshes in urban seascapes
(Funded by the University of Bologna general budget and co-funded by the Department of Cultural Heritage with funds made available by the project ADRIACOST - Prof.ssa Airoidi and the Macquarie University - Australia)

Saltmarsh communities provide many important ecosystem functions and services. Apart from sediment trapping, nutrient cycling, carbon sequestration and habitat provision, saltmarshes also dissipate wave energy and provide coastal protection. Despite their importance, many saltmarsh communities are either threatened or have been lost due to the pace of coastal urban development. Recently, efforts to restore salt marshes have been expanding, fostered by the growing recognition of their ability to function as cost-effective nature-based solutions to control shoreline erosion while providing co-benefits in terms of habitat conservation, water quality control, recreation and carbon sequestration. Despite increasing examples of successful large-scale applications, we still have little understanding about how functioning in restored saltmarshes

compares to remnant saltmarshes. This project focuses on quantifying relevant ecosystem functions and services in restored salt marshes and compare them to those in nearby natural or seminatural marshes in urban seascapes. Estimated functions and related services could include habitat creation, erosion control, or carbon sequestration. Particular attention will be devoted to the sediment bacterial communities. Bacterial communities play essential roles in estuarine marsh ecosystems, but the interplay of ecological processes underlying their community assembly is poorly understood. The student will describe the bacterial community successions along gradients of abiotic/biotic factors using 16S rRNA gene amplicon sequencing. The student will benefit from ongoing collaboration and support in both Italy and Australia, where there are recent successful examples of salt marsh restoration in an urban context.

10) Anthropology of Impact Investing and Global Health

(Funded by the Department of Cultural Heritage with funds made available by the project ERC n.772544 H2020 – project IMPACT HAU - Prof. Brightman)

The candidate's research will contribute to the project 'The Hau of Finance: Impact Investing and the Globalization of Social and Environmental Sustainability' (IMPACT HAU), funded by ERC consolidator grant 772544

(<https://cordis.europa.eu/project/rcn/218697/factsheet/en>). Investors and entrepreneurs increasingly collaborate with civil society actors to do the work of sustainable development using private capital. IMPACT HAU will assess whether, and where, this tendency may represent a cultural shift, what it entails, and how far-reaching and heterogeneous it is. Through exchange theory we frame the study of impact investing beyond capitalism, treating impact bonds as ethnographic objects. We will use fine-grained ethnographic research to assess whether impact investing is merely opening new frontiers for financialization and deepening the political crisis of the developed world, or whether indeed it is helping to bring about the radical transitions that can lead to greater sustainability.

The candidate will undertake a PhD in anthropology to carry out a detailed study of the use of a medical bond or sukuk to support the prevention of infectious disease in the global south, e.g. malaria or cholera. The successful candidate will have good degree qualifications to masters level, including training in medical anthropology and ethnography, and should submit writing samples with the PhD application. (S)he will be able to demonstrate knowledge of the field of global health and, preferably, relevant experience. (S)he will have excellent written and spoken English, and knowledge of other languages relevant to the PhD proposal. (S)he must be prepared to conduct long term fieldwork, and to carry out research as part of a team based in the Department of Cultural Heritage in Bologna.

11) Anthropology of Impact Investing and Migration

(Funded by the Department of Cultural Heritage with funds made available by the project ERC n.772544 H2020 – project IMPACT HAU - Prof. Brightman)

The candidate's research will contribute to the project 'The Hau of Finance: Impact Investing and the Globalization of Social and Environmental Sustainability' (IMPACT HAU), funded by ERC consolidator grant 772544

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The candidate will undertake a PhD in anthropology to carry out a detailed study of the use of a financial instrument such as a social impact bond (SIB) or development impact bond (DIB) to address problems related to international migration, e.g. 'social integration', 'improving livelihoods', etc. The successful candidate will have good degree qualifications to masters level, including training in anthropological theory and ethnography, and should submit writing samples with the PhD applications. (S)he will be able to demonstrate knowledge of the field of migration studies or related areas and, preferably, relevant experience. (S)he will have excellent written and spoken English, and knowledge of other languages relevant to the PhD proposal. (S)he must be prepared to conduct long term fieldwork, and to carry out research as part of a team based in the Department of Cultural Heritage in Bologna.

12) Digital Heritage tools for the communication and enhancement of the Darsena district in Ravenna

(Funded by the Department of Cultural Heritage with funds made available by the project Urban Innovative Actions (UIA) - PROGETTO DARE - Prof. Iannucci)

The research project will develop methodologies for an effective digital transition of the urban environment of the Darsena district of Ravenna through the design of tools able to perform a wide-ranging public narration of the cultural memory on the extended period, bringing together classical and late-antique archaeology with industrial archaeology. The project will perform semantic cataloguing of both textual and iconographical documents, provide geo-referencing techniques of urban spaces and imaginary settings, identify a digital best practice for the development of monumental and urban spaces in a temporary or prolonged state of decay, employ Web 3.0 tools – especially for mobile devices – for social and public recovery of the cultural heritage, digital storytelling, and the design of digital tours and installations.

13) Individual human biological life history reconstruction through dental enamel analysis

(Funded by the Department of Cultural Heritage, partly with funds made available by the project ERC n. 724046 H2020 – project SUCCESS - Prof. Benazzi)

Teeth preserve an accurate biological archive of the individual growth, development, diet, chemistry, and possible pathologies. Teeth's chemical and physical characteristics make them particularly suitable for preservation and fossilization, both in archaeological and paleoanthropological contexts, and therefore constitute the majority of the bioarchaeological and fossil records. In addition, tooth mineralized tissues are deposited incrementally on a circadian rhythm, recording the individual growth rates that can be directly measured thanks to their layered structure. The teeth's growth trajectories can be

correlated to that of the whole body, and hence the information that can be drawn from their study can be extended, to a certain extent, to the study of the ontogenetic trajectories of current populations and of our ancestors, also in an evolutionary perspective. The main investigative tool of this project will be the classic histological approach through the thin sectioning of teeth, analyzed by Transmitted Light Microscopy and, whenever opportune, by Scanning Electron Microscopy. To strengthen the efficacy of the histological analysis, the trace element composition of the enamel will be recovered through histologically controlled LA-ICPMS (Laser Ablation Inductively Coupled Plasma Mass Spectrometry) elemental analysis. Sr/Ca, Ba/Ca for the dietary reconstruction, Zn/Ca for the mineralization signal, Pb/Ca to detect the environmental pollution and U/Ca and other rare elements as indicators of diagenesis are planned to be quantified.

14) Digital Heritage tools for the communication and enhancement of the Darsena district in Ravenna (Financed by Flaminia Foundation)

The research project will develop methodologies for an effective digital transition of the urban environment of the Darsena district of Ravenna through the design of tools able to perform a wide-ranging public narration of the cultural memory on the extended period, bringing together classical and late-antique archaeology with industrial archaeology. The project will perform semantic cataloguing of both textual and iconographical documents, provide geo-referencing techniques of urban spaces and imaginary settings, identify a digital best practice for the development of monumental and urban spaces in a temporary or prolonged state of decay, employ Web 3.0 tools – especially for mobile devices – for social and public recovery of the cultural heritage, digital storytelling, and the design of digital tours and installations.

17) The Romagna Acque Società delle Fonti S.p.A. archive: between tradition and innovation. A census, inventory and enhancement project (Funded by Romagna Acque)

Romagna Acque, a joint stock company, owner of all drinking water sources for civil uses in Emilia Romagna, was founded in 1966 by the Water Consortium for the Provinces of Forlì and Ravenna. The corporate archive, of great consistency and priceless value, wants to be returned to the historical memory of the company and the territory. The three-year research project will therefore be focused on the analysis, rearrangement and enhancement of the company's documentary heritage, through the use of archival description software and modern technologies applied to the sector.

Curriculum B

15) Computer Science for the interpretation and valorisation of scientific data acquired on artistic and historical objects

(Funded by the University of Bologna general budget and co-funded by the Department of Cultural Heritage, partly with funds made available by CIRI ICT)

The main objective of this research is to investigate and implement computational data processing algorithms and tools in the field of cultural heritage conservation, with the aim of developing innovative pathways for visualization, classification, interpretation and valorisation of scientific data.

16) Accurate radiocarbon dating on shells

(Funded by the University of Bologna general budget and co-funded by the Department of Chemistry "G. Ciamician" with funds made available by the project ERC n. 803147 - Resolution - Prof. Talamo)

The aim of the research is to develop new methods and setup new protocol dealing with different aspects of pretreatment on shells for radiocarbon dating. This project is incorporated into RESOLUTION "Radiocarbon, tree rings and solar variability provide an accurate timescale for human evolution and geoscience", funded by an ERC starting grant (n. 803147), since shells often represent the only available materials for an accurate temporal contextualisation of the archaeological sites using radiocarbon. The PhD candidate will concentrate the research on the characterisation of the primary carbonate phase, the recrystallisation in a secondary phase, studying the potential incorporation of modern carbon that can alter the ¹⁴C dates in shells. S(he) will be devoted to testing new pretreatment protocols for the extraction of original carbon in shells for radiocarbon dating and applying the new method to selected archaeological case studies. It will be requested, for the success of the PhD project, a qualification at the Masters level focusing on the Marine Environment, including a good degree in Natural Science. S(he) will have experience in a chemistry laboratory. (S)he will have excellent written and spoken English, and knowledge of another language relevant to the research project. S(he) must be prepared to conduct the research as part of the RESOLUTION team at Bologna University and must have knowledge of Italian.