PERSONAL INFORMATION

		CV date	17-02-2025

First name	Antonietta		
Family name	Del Bove		
Gender (*)	Female	Birth date	18/07/1987
e-mail	antoniadelbove@gmail,com	Webhttps://www.researchgate.net/profile/Antonietta-Del-Bove	
Open Researcher and Contributor ID (ORCID) (*)		https://orcid.org/0000-0001-6620-4514	

Current position

Position	Post-doc researcher
Initial date	1/10/2024
Institution	University of Bologna
Department/Center	Bones Lab	Department of Cultural Heritage
Country	Italy
Key words	Paleoanthropology/ South American first population/ skeleton/ GM

Previous professional status

Period	Position/Institution/Country/Interruption cause
02/12/2023-04/02/2024	Postdoctoral Orientation Period (PoP) /URV-Spain
13/05/2024-14/06/2024	Archaeological Site Director/Absis and Government of Catalonia/ Spain
2021-2023	Predoctoral Researcher/URV-Iphes Cerca/Spain/ThesisDefence
2018-2019	Research Project Grant/URV and University La Sapienza (UNIROMA1)/SPAIN-ITALY

Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Paleoanthropology	University Rovira i Virgili (SPAIN)	2023
Ms in Archaeology	University of Florence (ITALY)	2015
Bs in History and Protection of Archaeological Heritage	University of Florence (ITALY)	2011

CV SUMMARY

I am an **Archaeologist and Anthropologist** specializing in the study of ancient **human remains**, employing **Geometric Morphometric** techniques (GM). Actually, I am a postdoctoral research fellow at the University of Bologna, Department of Cultural Heritage, and at the Bones Lab (Ravenna,IT). My postdoctoral project, titled *"Habits: Life Histories of Prehistoric Human Groups in Southeastern South America - A Tale of Adaptation and Subsistence Economies,"* is led by Dr. Eugenio Bortolini as the Principal Investigator. In December 2023 I completed my **International Doctorate in Palaeoanthropology** on January 12, 2023, achieving an excellent qualification *cum Laude*. My doctoral thesis, titled "A Computational Re-assessment of Sexual Dimorphism in the Human Cranium: Novel Approaches Beyond Traditional Morphometrics," was funded by the predoctoral fellowship 2020PMF-PIPF-43. My expertise revolves around advancing our **understanding of sexual dimorphism in the *H. sapiens*** cranium through GM, Virtual Anthropology, and Artificial Intelligence. Throughout my Ph.D., I introduced novel methods (Del Bove et al., 2023; Del Bove & Veneziano, 2022) aimed at surpassing traditional approaches to establishing the sex of individuals. These methods, which provide a global framework overcoming specific population limitations, have contributed to revaluating dimorphic traits of the cranium using statistical methods. I possess proficiency in various **virtual anthropology** techniques, modelling methods, 3D software, medical design approaches, and multivariate analysis. As an advanced user, I utilize key software and computer languages such as **R**, employing the Arothron package for importing landmark configurations, Morpho and geomorph for multivariate analysis, and

rgl for 3D modeling. Actively advocating for **Open Science**, I have been a member of the Open Science Working Group (OSWG) at my current institution since 2021. Additionally, I excel in managing diverse types of data and code repositories, including Github, Zenodo, and Morphosource (see Section C). My traditional anthropology foundation was shaped during my training years at the University of Florence and while working with the Soprintendenza at the Bioarchaeology laboratory. I enriched my knowledge through the study of two significant sites in Tuscany, Italy: Grotta Spinosa (MNI=41 individuals) and Grotta dello Scoglietto (MNI=42 individuals). Commencing my Ph.D. as an IP of a project in the Lazio region, I focused on the crania collection of the Anthropological Museum of Rome "G. Sergi." My collaboration with the IPHES-CERCA. I made two mobility during my Ph.D., first (2 months) in Florence Anthropological Museum to collect the samples used in the thesis and second to complete the the "Torno subito Project" (7 months) in Rome La Sapienza University. During my Ph.D., I supervised a master's student thesis on sexual dimorphism in ontogenesis at the University of Ferrara (Italy). I actively participated in over 20 archaeological and paleoanthropological fieldwork projects, nationally and internationally (e.g., Atapuerca in Spain, Dmanisi in Georgia, Romito Cave in Italy, Olduvai in Tanzania, etc.). I possess the ability to convey knowledge to diverse audiences, not just specialized researchers. **Organizing two workshops** (2020 and 2022) on the use of R (IPHES, 20 participants, and for the University of La Frontera in Chile) **and an international Congress** AHEAD (2023) with 120 participants in Tarragona exemplifies my commitment. I secured a Wenner Grenn grant and received funding from the Tarragona Municipality for organizing the AHEAD Conference (Euro 10,000). I organized a congress of Young Italian Association of Anthropology (2023) and the session "number 666" of EAA (2023) in Rome. Additionally, I serve as an **Editorial Board Member for the Data in Brief** Journal at Elsevier and act as a Reviewer for *Sci Rep*. *J of Anat*, and *Frontiers* and others, also I revised a postdoctoral project for National Science Centre of Poland. My commitment to promoting scientific awareness extends to my role as an educator in prehistory courses in schools (Instituto Statale Itri -LT, Italy) and Pint of Science 2024. I actively participated as a teacher during the **International Day of Women and Girls in Science** at #100tífiques, an event organized by the Fundación Catalana para la Investigación y la Innovación and the Barcelona Institute of Science and Technology on February 11, 2021, for the student of college school of Barcelona.

RELEVANT MERITS
Publications (10 most important)

1. 2023 **Del Bove, A**.(**CA**), Menéndez, L., Manzi, G. *et al.* Mapping sexual dimorphism signal in the human cranium. *Sci Rep* **13**, 16847 (2023). https://doi.org/10.1038/s41598-023-43007-y. *This publication aims to generate a new map of sexual signals in the cranium, specifically by eliminating the occipital protuberance as a dimorphic trait. It also offers an opportunity to present an innovative methodology.*

2. 2023 R. Manzollino, S.G. Malatesta, D. Avola, L. Cinque, **A. Del Bove**, L. Leopardi and M. R. Marini.Enhancement and Communication of Ancient Human Remains through VR: The Case Study of Sexual Dimorphism in the Human Skull. Heritage, 6(5), pp. 4120-4133 https://doi.org/10.3390/heritage6050217. *In the paper, we utilized my data to develop a virtual reality application for modeling cranium sex for museum use.*

3. 2022 Bucchi, A., **Del Bove, A.**, Lopez-Lazaro, S., Quevedo-Diaz, F., Fonseca, G.M. Digital Reconstructions Using Linear Regression: How Well Can It Estimate Missing Shape Data from Small Damaged Areas? Biology,11(12), 1741 https://doi.org/10.3390/biology11121741. *Through virtual anthropology and statistical analysis, we devised a method to fill gaps in the 3D model.*

4. 2022 **Del Bove, A.**, Veneziano, A. A Generalised Neural Network Model to Estimate Sex from Cranial Metric Traits: A Robust Training and Testing Approach. Applied Sciences, 2022, 12 (18), 9285 https://doi.org/10.3390/app12189285. *The paper has a dual purpose: the primary and most significant is to introduce a new method for determining sex using Machine Learning applied to a worldwide sample. The secondary aim is to establish a protocol for future research.*

5. 2022 Gamarra, B., Lozano, M., **Del Bove, A.**, (…) Gomez-Bach, A. Identifying biological affinities of Holocene northern Iberian populations through the inner structures of the upper first molars. (3/12) Archaeological and Anthropological Sciences. 2022, 14(3), 38 https://doi.org/10.1007/s12520-021-01499-7. *In that publication, my goal was the application of Geometric Morphometrics (GM).*

6. 2021 M. Melchionna, A. Profico, C. Buzi, S. Castiglione , A. Mondanaro, **A. Del Bove**, G. Sansalone,

P. Piras, P. Raia. A new integrated tool to calculate and map bilateral asymmetry on three-dimensional digital models, <u>Symmetry</u>, 2021, 13(9), 1644, https://doi.org/10.3390/sym13091644. *This study demonstrates the utility of GM in analyzing asymmetry, which is crucial for comprehending the evolution and biological development of skeletons. We present a specific function for calculating asymmetry.*

7. 2020 **Del Bove, A. (CA)**, Profico, A., Riga, A., Bucchi, A., Lorenzo, C A geometric morphometric approach to the study of sexual dimorphism in the modern human frontal bone.. <u>American Journal of Physical Anthropology</u>, 2020, 173(4), pp. 643-654 https://doi.org/10.1002/ajpa.24154. *In that publication, GM was used to study the highly dimorphic frontal bones of the human skull. Employing semilandmarks, we developed a method to analyze various aspects, revealing that the supraorbital ridges, not the glabella, are the most crucial trait.*

8. 2020 Bucchi, A., Luengo, J., **Del Bove, A.**, Lorenzo, C. Insertion sites in manual proximal phalanges of African apes and modern humans. American Journal of Physical Anthropology, 2020, 173(3), pp. 556-567https://doi.org/10.1002/ajpa.24127. *In that paper, we examined the phalanx insertion in humans and related species, assessing evolutionary differences and key characteristics.*

9. 2019 **Del Bove, A.(CA)**, Profico, A., Lorenzo, C. 2019 IMEKO TC4 International Conference on Metrology for Archaeology and Cultural Heritage, <u>MetroArchaeo 2019</u>, pp. 571-575. https://www.imeko.org/publications/tc4-Archaeo-2019/IMEKO-TC4-METROARCHAEO-2019-111.pdf. *This research marks a pivotal step towards my Ph.D. thesis, representing my initial attempt to develop a quantitative method for sex detection, focusing on the neurocranium.*

10. 2019 Antonio Profico, Paolo Piras, Costantino Buzi, **A. Del Bove**, Marina Melchionna, Gabriele Senczuk, Valerio Varano, Alessio Veneziano, Pasquale Raia, Giorgio Manzi Seeing the wood through the trees. Combining shape information from different landmark configurations. <u>Hystrix It. J. Mamm.</u> 2019;30(2):157-165. *The paper provides an alternative to 3D usage when collecting the model is not feasible.*

Congress

I've participated with poster and oral presentations at more than 20 international congress (ESHE from 2017 to 2023, SAP 2021, 2020, AAI 2021 2022, AABA 2022, Uispp 2018, 2023,IIPP 2018 etc.). Following last 10 contributions to congresses:

1. Invited Talk 1/10/2014. University of Lleida, Department of Geography, History and history of art. **A. Del Bove**, Title:"From Prehistory to modern society: the role of physical anthropology in understanding sexual dimorphism and mate systems".

2. <u>Invited talk</u> 31/10/23. University of Pisa, Department of Biology course of Geometric Morphometrics: **A. Del Bove**. Dimorfismo sessuale & Morfometria Geométrica nello studio del cranio umano.

3. 2023 UISPP Timisoara, Romania. <u>Oral Presentation</u>: **A. Del Bove**, A. Profico , A. Veneziano. C. Lorenzo. New Perspectives on sex identification from human cranial morphology (S4-1).

4. ESHE 2023. <u>Poster</u>. **A. Del Bove**, A. Profico, C. Lorenzo, A. Veneziano. Unravelling sexual dimorphism in human crania: in-depth exploration using Neural Networks.

5. 2023 29th EAA, Belfast (Northern Ireland) <u>Poster</u>: "From the prehistoric site to the cloud: The IPHES-CERCA Open Data approach", session "Replicable Archaeology: Looking for Workflows and Data Management Strategies. Fostering Data Reuse and Methodological Transferability in Archaeological Science". M. Fontanals, J. Sopesens, A. Bargalló, **A. Del Bove**, B. Gómez de Soler, J. Revelles, A. Rodríguez, I. Pastó.

6. Poster: "It Takes a Village: Interdisciplinary Bioarchaeological Research on the Role of Children in the Past". S. Bernardini, G. Goude, K. L. Sayle, C. Gauthier, E. Douville, B. Aranguren, **A. Del Bove**, M. A.Tafuri.

7. Invited talk 13/09/22. Field School of Orozmani (Dmanisi-Georgia), Org. by G. Bidzinashivili. **A. Del Bove.** New Solution for old problems: a case of study of sexual dimorphism in the human cranium.

8. 2022 <u>Poster</u>. ESHE Exploring the impact of sexual dimorphism on cranial asymmetry in a Worldwide modern human collection". **A. Del Bove**, A. Profico, M. Melchionna, P. Raia, C. Lorenzo.

9. <u>Invited Talk</u>. 10/06/22. **A Del Bove.** New frontiers in biological anthropology: sexual dimorphism in skeletal remains. Field School of Orozmani (Dmanisi-Georgia).

10. 2022 AABA. <u>Oral Presentation</u>. Bilateral asymmetry and sexual dimorphism in the human cranium". A. Del Bove,A. Profico, M. Melchionna, P. Raia, C. Lorenzo.

Research projects

1. PRIN: Nationally Significant Research Projects – 2022 call Investigator of the project "HABITS - Life-histories of prehistoric human groups in South America: a tale on environmental adaptations and subsistence economies" Duration: 24 months. Ministerial funding: €208,334.

2. PID2021-122355NB-C32, Ecosocial behavior of the hominids of Atapuerca during the Quaternary VI. Ministerio de Ciencia e Innovación, Proyectos de Generación de Conocimiento. IP: M. Mosquera, E. Carbonell, IPHES 2022-2025, 302.500€. Team member with active participation in the Galeria site

3. 2021 SGR0123, Social, cultural and Biological Evolution during the pleistocene (StEP), IP: Dr. Andreu Olle (AGAUR), 2022-2024, 40.000€. Team member , with active contribution in the aspect of Bio-anthropological field.

4. CLT009/ 22/00042. Arrels prehistoriques de la transhumancia a l'Alt Ripolles: project Arqueològic 2022-2025, 54.022,84€, PI: Carlos Tornero. Departament de Cultura. Generalitat de Catalunya.Team member in the 3D digitalization of the human fossils.

5. 2017-SGR-1040, Social, cultural and biological Evolution during the Pleistocene (StEP). Agència de Gestió d'Ajuts Universitaris i de Recerca, Ajuts per donar suport a les activitats dels grups de recerca de Catalunya. PI: A. Ollé, IPHES. 2018-2021. 60.328 €.Team member

6. PGC2018-093925-B-C32, Ecosocial behavior of the hominids of Atapuerca during the Quaternary V. Ministerio de Ciencia e Innovación y Universidades, Proyectos de Generación de Conocimiento. PI: E. Carbonell, M. Mosquera, IPHES. 2019 –2021. 396.880€. Team member with active participation in the Galleria site and Mirador Cave fieldwork.

7. ID7515 del 18-09-2017. Grant financed by LAZIODISU, Proyecto: TornoSubito 2017. 10.291,29€. **IP: Antonietta Del Bove** for the study of human cranial remains of the modern lazium population in collaboration with the University of Rome la Sapienza (Prof. Giorgio Manzi) and URV (Prof. Carlos Lorenzo). Based on a collaboration between the URV and UNIROMA1, I started the study of the Rome collection with the development of new methods based on the Geometric Morphometric Approach. Thank that project also, I stated my collaboration with URV.

Dataset published on open repositories:
1.A. Profico, & **A. Del Bove.** (2023). Code to reproduce data in "Mapping sexual dimorphism signal in the human cranium" (1.1) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.8304736.
2.A. Bucchi, & **A. Del Bove**. (2022). Accuracy in estimating missing shape data using linear regression. https://doi.org/10.5281/zenodo.6833471.
3.**Del Bove, A.,** Veneziano, A. 2022.The code to reproduce the analysis, the model generated, and the script to use the model are made publicly available on **GitHub** at the following link: **https://github.com/AlessioVeneziano/Papers/tree/main/DelBove_%26_Veneziano_2022.**
4.Gamarra, B., & **Del Bove, A**. (2022). Identifying biological affinities of Holocene northern Iberian populations through the inner structures of the upper first molars. https://doi.org/10.5281/zenodo.5891983.

Research grants and awards
2023 Wenner-Gren Foundation Grant for Conference ($18.570,00 for AHEAD meeting 2023 - Tarragona
https://ahead-meeting.org/).
2022 Poster Prize co-author ESHE2022.
2022 Travel Grant ESHE.
2021-2023 Martí-Franquès Research Grants Programme. Doctoral Grants. 2021. 2020PMF-PIPF-43.
2019 Scholarship by Atapuerca Foundation to excavate to Dmanisi (Georgia).
2019 Poster prize AAI (Italian Association of Anthropology).
2018 Scholarship "Course of Anatomical Network Analysis (AnNA)" Transmitting Science Ltd.
2017 "Tornosubito" Project. Lazio fellowship 10.291,29 €.