

# João Pedro Valente de Oliveira Coelho | Curriculum Vitae

DPhil candidate, University of Oxford

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**Current research interests:** geospatial palaeontology, machine learning applications to bioanthropology, geometric morphometrics, hominin origins, evolution of bipedalism

## Education and Training

- 2017-** **DPhil in Evolutionary Anthropology** – University of Oxford (United Kingdom)  
**Project:** Automated geospatial search for human ancestors in Mozambique: a computer vision and machine learning approach  
**Supervisors:** Prof. Robert L. Anemone (The University of North Carolina at Greensboro) and Prof. Susana Carvalho (ICEA, University of Oxford)
- 2013-2015** **Master's Degree in Human Evolution and Biology** – Universidade de Coimbra (Portugal)  
**Dissertation:** Unwarping Heated Bones: A Quantitative Analysis of Heat-induced Skeletal Deformations Using 3D Geometric Morphometrics  
**Supervisors:** Dr. David Gonçalves and Prof. Eugénia Cunha (Universidade de Coimbra)
- 2012-2013** **Erasmus programme** – Háskóli Íslands (Iceland)
- 2010-2013** **Graduation in Anthropology** – Universidade de Coimbra (Portugal)

## Honours and Awards

- 2018** **The Boise Trust Fund Research Award** – Department of Zoology, University of Oxford
- 2017** **The Boise Trust Fund Research Award** – Department of Zoology, University of Oxford
- 2017-2021** **PhD Scholarship SFRH/BD/122306/2016** – Fundação para a Ciência e a Tecnologia, Portugal
- 2014** **Finalist: "Best Business Plan" for Osteomics** – Arrisca C 2014, Universidade de Coimbra
- 2013-2014** **Grant recipient for a biotech startup** – Passaporte para o Empreendedorismo, IAPMEI
- 2013** **Finalist: "Best Business Idea" for Osteomics** – Arrisca C 2013, Universidade de Coimbra
- 2012-2013** **Scholarship: LLP/Erasmus Programme** – Háskóli Íslands (University of Iceland)

## Publications

- d'Oliveira Coelho J**, Curate F. 2019. CADOES: An interactive machine-learning approach for sex estimation with the pelvis. *Forensic Science International*. 302:109873.
- Ammer S, d'Oliveira Coelho J, Cunha E.** 2019. Outline Shape Analysis on the Trochlear Constriction and Olecranon Fossa of the Humerus: Insights for Sex Estimation and a New Computational Tool. *Journal of Forensic Sciences*. DOI:10.1111/1556-4029.1409.
- Vilas-Boas D, Wasterlain SN, d'Oliveira Coelho J, Navega D, Gonçalves D.** 2019. SPINNE: An app for human vertebral height estimation based on artificial neural networks. *Forensic Science International*. 298:121–130.
- Silva A, Tomé T, Cunha C, d'Oliveira Coelho J, Valera A, Filipe V, Scott GR.** 2018. Unilateral absence of mandibular condyle in a Bronze Age male skeleton from Portugal. *International Journal of Paleopathology*, 22: 168–172.
- Scott GR, Pilloud M, Navega D, d'Oliveira Coelho J, Cunha E, Irish J.** 2018. rASUDAS: A New Web-Based Application for Estimating Ancestry from Tooth Morphology. *Forensic Anthropology* 1:18–31.
- Gonçalves D, d'Oliveira Coelho J, Amarante A, Makhoul C, Oliveira-Santos I, Navega D, Cunha E.** 2018. Dead weight: Validation of mass regression equations on experimentally burned skeletal remains to assess skeleton completeness. *Science & Justice* 58:2–6.
- Navega D, d'Oliveira Coelho J, Cunha E, Curate F.** 2018. DXAGE: A New Method for Age at Death Estimation Based on Femoral Bone Mineral Density and Artificial Neural Networks. *Journal of Forensic Sciences*, 63(2): 497–503.

- Makhoul C, Amarante A, **d'Oliveira Coelho J**, Navega D, Almeida M, Parker SF, Ferreira MT, Viegas DX, Marques M, de Carvalho LB, Gonçalves D, Cunha E. 2017. Experimental burning and real fire scenarios: Are they comparable in terms of chemical anthropology? *La Revue de Médecine Légale*, 8(4): 187.
- Gonçalves D, **d'Oliveira Coelho J**, Acosta MA, Coelho C, Curate F, Ferreira MT, Gouveia M, Makhoul C, Pinto D, Oliveira-Santos I, Vassalo AR, Navega D, Cunha E. 2016. One for all and all for one: Linear regression from the mass of individual bones to assess human skeletal mass completeness: Linear Regression of Human Skeletal Mass. *American Journal of Physical Anthropology* 160:427–432.
- Curate F, **d'Oliveira Coelho J**, Gonçalves D, Coelho C, Ferreira MT, Navega D, Cunha E. 2016. A method for sex estimation using the proximal femur. *Forensic Science International* 266:579.e1–7.
- Andrade B, Dias P, Coelho C, **d'Oliveira Coelho J**, Navega D, Wasterlain SN, Ferreira MT, Santos BS. 2016. Towards automatic non-metric traits analysis on 3D models of skulls. In: *23rd Portuguese Meeting on Computer Graphics and Interaction (EPCGI)*:1–7. DOI: 10.1109/EPCGI.2016.7851196

## Work Experience

- 2016-2017** Co-founder, webmaster and R instructor | **JEST - Junior Enterprise for Science and Tech**
- data modelling and visualization for life and health sciences
  - workshops and conferences on programming languages (R and Python) and data science
  - web developer and designer – [jest.pt](http://jest.pt)
- 2015-** Researcher | **Centre for Functional Ecology**, Coimbra (Portugal)
- collaborator at the Paleoecology and Forensic Sciences group – [cfe.uc.pt](http://cfe.uc.pt)
  - statistical shape analysis (geometric morphometrics) of osteological material
  - webmaster and webdesigner at Laboratory of Forensic Anthropology – [lfa.uc.pt](http://lfa.uc.pt)
  - 3D scanning expert and curator of the CEIXXI 3D Crania Collection (see [sketchfab.com/lfa](http://sketchfab.com/lfa))
  - public communication and workshops, presenting scientific topics to the general public
- 2013-** Co-founder, software developer, designer | **Osteomics** (startup venture)
- developed over 10 web-apps for biological and forensic anthropologists that allow to estimate age at death, sex, stature and biogeographic origin (see [osteomics.com](http://osteomics.com))
  - acquired experience with osteology, photogrammetry, 3D scanning and printing, machine learning, and business skills

## Paleontological Fieldwork (4 months)

- 2019 (4 weeks)** Gorongosa, Mozambique – Instructor at the Oxford-Gorongosa Paleo-Primate Field School (University of Oxford); PhD researcher at Gorongosa National Park.
- 2019 (6 weeks)** East Turkana, Kenya – Graduate Assistant at the Koobi Fora Field School (George Washington University); member of the Paleoecology research group at Koobi Fora.
- 2018 (4 weeks)** Gorongosa, Mozambique – Instructor at the Oxford-Gorongosa Paleo-Primate Field School (University of Oxford); PhD researcher at Gorongosa National Park.

## Scientific Conferences

- d'Oliveira Coelho J**, Braun DR, Bobe R, Anemone RL, Carvalho S. A MaxEnt approach to estimate the likelihood of finding new fossil sites in Lake Turkana, Kenya, using satellite images. *9<sup>th</sup> Annual European Society for the study of Human Evolution meeting*, Liège, Belgium, 2019 (Poster).
- Gabriel B, Makhoul C, **d'Oliveira Coelho J**, de Carvalho LB, Cunha E. Thermally induced changes: influence of duration of heat exposure on colorimetry, morphometry and chemometrics. *FASE – Forensic Anthropology Society of Europe Advanced Course in Forensic Anthropology and One-Day Symposium 2019*, Brussels, Belgium, 2019 (Poster).
- d'Oliveira Coelho J**, Anemone RL, Carvalho S. Filling gaps in primate evolution: machine learning approaches for automated fossil site discover in Gorongosa, Mozambique. *European Federation for Primatology & the Primate Society of Great Britain Winter meeting*, Oxford, United Kingdom, 2019 (Podium).

- d'Oliveira Coelho J**, Anemone RL, Bobe R, Carvalho S. Let the computers do the surveying: applying support vector machines on spectral data to identify new fossiliferous deposits in Koobi Fora, Kenya. *Paleoanthropology Society 2019 Meeting*, Albuquerque, USA, 2019 (Poster).
- d'Oliveira Coelho J**, Anemone RL, Carvalho S. Standing out in a crowd of trees: spectral outliers as predictors of fossiliferous outcrops in modern forests. *Unravelling Human Origins 2019*, York, United Kingdom, 2019 (Podium).
- d'Oliveira Coelho J**, Anemone RL, Carvalho S. Fossil sites as landscape outliers: the potential of the dbSCAN clustering algorithm for detecting fossiliferous outcrops in forests. *16<sup>th</sup> Conference of the Gesellschaft für Primatologie*, Göttingen, Germany, 2019 (Poster).
- d'Oliveira Coelho J**, Anemone RL, Carvalho S. Finding the needle in a haystack: automating spectral remote searching for hominin fossil sites in Gorongosa, Mozambique. In: *Proceedings of the European Society for the Study of Human Evolution*. 56. Faro, Portugal, 2018 (Poster).
- d'Oliveira Coelho J**, Anemone RL, Carvalho S. Why bother surveying? How automated search of fossil sites in Africa can help fill gaps in hominoid evolution. *Abstracts of the 27th International Primatological Society Congress*. Event-714. Nairobi, Kenya, 2018 (Podium).
- Ammer S, **d'Oliveira Coelho J**. Estimating Sex with Outline Shape Analysis of the Trochlear Constriction and the Olecranon Fossa. *American Academy of Forensic Sciences 70th Annual Scientific Meeting*, Seattle, USA, 2018 (Podium).
- d'Oliveira Coelho J**, Ammer S. Sex estimation based on outline shape analysis of the posterior distal humerus, *MORPH 2017 - A Conference on the Archaeological Applications of Morphometrics*, Aarhus, Denmark, 2017 (Podium).
- Ferreira MT, Coelho C, Rufino AI, Navega D, **d'Oliveira Coelho J**, Wasterlain SN. Os Escravos do Valle da Gafaria: recuperar a identidade através dos ossos, *Dia Internacional dos Museus*, Viseu, Portugal, 2017 (Podium).
- Rodrigues H, Fagundes L, Ramos R, Galego O, **d'Oliveira Coelho J**, Navega D, Caseiro-Alves F, Cunha E. Análise da mastóide, ouvido médio e ouvido interno em tomografia axial computadorizada (TAC) - Possível contribuição para a identificação de cadáveres, *16<sup>o</sup> Congresso de Medicina Legal e Ciências Forenses*, Coimbra, Portugal, 2017 (Podium).
- Navega D, **d'Oliveira Coelho J**, Cunha E, Curate F. Estimativa da idade à morte com base na densidade mineral óssea do fémur proximal: uma abordagem com redes neuronais artificiais, *III Conferência do Instituto Nacional de Medicina Legal e Ciências Forenses*, Coimbra, Portugal, 2016 (Poster).
- Rufino AI, **d'Oliveira Coelho J**, Navega D. A coleção PAVd'09 (Lagos): futuro e novas perspectivas. *V Jornadas Portuguesas de Paleopatologia*, Coimbra, Portugal, 2016 (Podium).
- Coelho C, **d'Oliveira Coelho J**, Navega D, Andrade B, Dias P, Santos BS, Wasterlain SN, Ferreira MT. CraMs: uma ferramenta informática para a análise antropológica do crânio, *III Conferência do Instituto Nacional de Medicina Legal e Ciências Forenses*, Coimbra, Portugal, 2016 (Poster).
- Navega D, **d'Oliveira Coelho J**, Cunha E, Curate F. Estimativa da idade à morte com base na densidade mineral óssea do fémur proximal: uma abordagem com redes neuronais artificiais, *III Conferência do Instituto Nacional de Medicina Legal e Ciências Forenses*, Coimbra, Portugal, 2016 (Poster).
- Ferreira MT, Coelho C, Rufino AI, **d'Oliveira Coelho J**, Navega D, Wasterlain SN. Os Escravos do Valle da Gafaria: novos dados e novas questões, *A História e a Memória dos Escravos Africanos*, Lagos, Portugal, 2016 (Podium).
- Navega D, Coelho C, **d'Oliveira Coelho J**, Vicente R, Ferreira MT, Wu J, Cunha E. AncestTrees: uma nova ferramenta para a avaliação da ancestralidade em Antropologia forense, *I Congresso da Associação Portuguesa de Ciências Forenses*, Porto, Portugal, 2016 (Podium).
- Gonçalves D, **d'Oliveira Coelho J**, Makhoul C, Navega D, Cunha E. MassReg: An application to predict the skeleton mass of adult individuals in incomplete or poorly preserved assemblages of human remains, *XXI Jornadas Mediterrâneas de Medicina Legal*, Badajoz, Spain, 2016 (Podium).
- Scott GR, Navega D, **d'Oliveira Coelho J**, Cunha E, Irish JD. rASUDAS: A New Method for Estimating Ancestry from Tooth Crown and Root Morphology, *The 85th Annual Meeting of the American Association of Physical Anthropologists*, Atlanta, USA, 2016 (Podium).
- d'Oliveira Coelho J**, Gonçalves D, Makhoul C, Oliveira-Santos I, Navega D, Coelho C, Curate F, Ferreira MT, Cunha E. Retrodeformação morfológica em ossos queimados para estimar a forma prévia e condições de queima, *II Conferência do Instituto Nacional de Medicina Legal e Ciências Forenses*, Coimbra, Portugal, 2015 (Podium).
- Navega D, **d'Oliveira Coelho J**, Coelho C, Vicente R, Ferreira MT, Curate F, Cunha E. Teste do método Diagnose Sexuelle Probabilistique (DSP) numa amostra da Coleção De Esqueletos Identificados do Século XXI, *II Conferência do Instituto Nacional de Medicina Legal e Ciências Forenses*, Coimbra, Portugal, 2015 (Poster).

Curate F, Cunha E, Gonçalves D, Coelho C, **d'Oliveira Coelho J**, Ferreira MT, Navega D. Um novo método para a determinação do sexo a partir do Fémur Proximal, *II Conferência do Instituto Nacional de Medicina Legal e Ciências Forenses*, Coimbra, Portugal, 2015 (Poster).

**d'Oliveira Coelho J**, Navega D, Cunha E. Evaluating the performance of classification algorithms for sex estimation through automated Procrustes configurations of 3D surface scans, *FASE One Day Meeting (Symposium)*, Montepellier, France, 2015 (Poster).

Gonçalves D, **d'Oliveira Coelho J**, Gouveia M, Makhoul C, Oliveira-Santos I, Vassalo AR, Santos AL, Carvalho LB, Cunha E. The Hot topic of burned human skeletal remains: Coimbra's contribution to Forensic Anthropology, *International Symposium on Anthropology and Natural Disasters*, Coimbra, Portugal, 2015 (Poster).

**d'Oliveira Coelho J**, Navega D, Cunha E. Sex Diagnosis Through Automated 3D Geometric Morphometrics of the Tali Bones, *II Bioanthropological Meeting*, Coimbra, Portugal, 2015 (Poster).

Makhoul C, **d'Oliveira Coelho J**, Gouveia M, Oliveira-Santos I, Vassalo AR, Ferreira MT, Cunha E, Gonçalves D. The Protocol for the Preparation of Burned Identified Skeletons of the CEI/XXI Collection, *II BioAnthropological Meeting*, Coimbra, Portugal, 2015 (Poster).

### Professional development

Used massive open online course (MOOC) platforms, to take courses offered by accredited universities and training programs in data science, programming, mathematics, natural history, among others.

Coursera, Inc. | [coursera.org](https://www.coursera.org)

**Johns Hopkins University:** The Data Scientist's Toolbox (100%); R Programming (100%); Getting and Cleaning Data (100%); Exploratory Data Analysis (100%); Reproducible Research (100%); Regression Models (100%); Practical Machine Learning (100%); Developing Data Products (100%); Mathematical Biostatistics Boot Camp 1 (94%); Mathematical Biostatistics Boot Camp 2 (100%); Bioinformatics: Life Sciences on Your Computer (93.5%); Statistical Analysis of fMRI Data (100%);

**Stanford University:** Machine Learning (100%); Statistical Learning (100%);

**University of Michigan:** Model Thinking (98.2%); Programming for Everybody (Python) (100%);

**The University of Melbourne:** Epigenetic Control of Gene Expression (94.9%);

**University of North Carolina:** Metadata: Organizing and Discovering Information (99.2%);

**University of Alberta:** Dino 101: Dinosaur Paleobiology (98.3%);

**University of Minnesota:** Introduction to Human Behavioral Genetics (98.6%);

**Emory University:** The Art and Archaeology of Ancient Nubia (99.4%);

**Rice University:** An Introduction to Interactive Programming in Python (98.3%);

**The University of Edinburgh:** Astrobiology and the Search for Extraterrestrial Life (97.8%); Introduction to Philosophy (98.2%).

edX, Inc. | [edx.org](https://www.edx.org)

**Harvard University:** PH525.1x Statistics and R for the Life Sciences (100%); PH525.2x Matrix Algebra and Linear Models (100%); PH525.3x Advanced Statistics for the Life Sciences (97%); PH525.4x Introduction to Bioconductor (94%); AT1x AnatomyX: Musculoskeletal Cases (98%);

**MIT – Massachusetts Institute of Technology:** MAS.S69x Big Data and Social Physics (100%);

**The University of Queensland:** World101x Anthropology of Current World Issues (98%);

**Karolinska Institutet:** KiexploreX Explore Statistics with R (90%);

**The University of Texas at Austin:** UT.7.01x Foundations of Data Analysis (93%);

**University of California, Berkeley:** Stat\_2.3x Introduction to Statistics: Inference (88%).

FutureLearn (The Open University) | [FutureLearn.com](https://www.futurelearn.com)

**University of Wollongong:** *Homo floresiensis* Uncovered (100%); Bioprinting: 3D Printing Body Parts (100%)

**University of Basel:** Statistical Shape Modelling (90%)

**University of Southampton:** Archaeology of Portus (100%)

**References:** References available upon request.