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Integrating palaeoproteomics into the zooarchaeological analysis of Palaeolithic bone assemblages

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References

- Abelson. (1954). Amino acids in fossils. *Science*.
- Aebersold, R., & Goodlett, D. R. (2001). Mass spectrometry in proteomics. *Chemical Reviews*, 101(2), 269–295.
- Airvaux. (2004). Le site paléolithique de chez-Pinaud à Jonzac, Charente-Maritime. *Prehistoire Du Sud-Ouest (Suppl. 8)*.
- Álvarez-Fernández, E. (2011). Humans and marine resource interaction reappraised: Archaeofauna remains during the late Pleistocene and Holocene in Cantabrian Spain. *Journal of Anthropological Archaeology*, 30(3), 327–343.
- Ashby, S. P., Coutu, A. N., & Sindbæk, S. M. (2015). Urban Networks and Arctic Outlands: Craft Specialists and Reindeer Antler in Viking Towns. *European Journal of Archaeology*, 18(4), 679–704.
- Backwell, L., Huchet, J. B., Harrison, J. D. G., & D'errico, F. (2022). Invertebrate Modification of Bone. *Manual of Forensic Taphonomy*, 631–666.
- Bailey, S. E., & Hublin, J. J. (2006). Did Neanderthals make the Châtelperronian assemblage from La Grotte du Renne (Arcy-sur-Cure, France)? In J.-J. Hublin, K. Harvati, & T. Harrison (Eds.), *Neanderthals Revisited: New Approaches and Perspectives* (pp. 191–209). Springer Netherlands.
- Banks, W. E., Antunes, N., Rigaud, S., & d'Errico, F. (2013). Ecological constraints on the first prehistoric farmers in Europe. In *Journal of Archaeological Science* (Vol. 40, Issue 6, pp. 2746–2753).
- Bartram, Jr., E., L., & Marean, C. W. (1999). Explaining the “Klasies Pattern”: Kua Ethnoarchaeology, the Die Kelders Middle Stone Age Archaeofauna, Long Bone Fragmentation and Carnivore Ravaging. *Journal of Archaeological Science*, 26(1), 9–29.
- Bar-Yosef, O. (1998). On the Nature of Transitions: the Middle to Upper Palaeolithic and the Neolithic Revolution. *Cambridge Archaeological Journal*, 8(2), 141–163.
- Bar-Yosef, O. (2004). Eat what is there: hunting and gathering in the world of Neanderthals and their neighbours. *International Journal of Osteoarchaeology*, 14(34), 333–342.
- Behrensmeyer, A. K. (1978). Taphonomic and ecologic information from bone weathering. *Paleobiology*, 4(2), 150–162.
- Behrensmeyer, A. K. (1983). Patterns of natural bone distribution on recent land surfaces: implications for archaeological site formation. *Animals and Archaeology: 1. Hunters and Their Prey ; BAR International Series*, 163, 93–106.

- Behrensmeyer, A. K. (1984). Taphonomy and the Fossil Record: The complex processes that preserve organic remains in rocks also leave their own traces, adding another dimension of information to fossil samples. *American Scientist*, 72(6), 558–566.
- Behrensmeyer, A. K., Gordon, K. D., & Yanagi, G. T. (1986). Trampling as a cause of bone surface damage and pseudo-cutmarks. *Nature*, 319(6056), 768–771.
- Behrensmeyer, A. K., Kidwell, S. M., & Gastaldo, R. A. (2000). Taphonomy and paleobiology. *Paleobiology*, 26(S4), 103–147.
- Berto, C., Krajcarz, M. T., Moskal-del Hoyo, M., Komar, M., Sinet-Mathiot, V., Zarzecka-Szubińska, K., Krajcarz, M., Szymanek, M., Wertz, K., Marciszak, A., & Others. (2021). Environment changes during Middle to Upper Palaeolithic transition in southern Poland (Central Europe). A multiproxy approach for the MIS 3 sequence of Koziarnia Cave (Kraków-Częstochowa Upland). *Journal of Archaeological Science: Reports*, 35, 102723.
- Binford, L. R. (1978). Dimensional Analysis of Behavior and Site Structure: Learning from an Eskimo Hunting Stand. *American Antiquity*, 43(3), 330–361.
- Binford, L. R. (1981). *Bones: ancient men and modern myths*. Academic Press.
- Binford, L. R. (1982). The archaeology of place. *Journal of Anthropological Archaeology*, 1(1), 5–31.
- Binford, L. R. (1984). Butchering, sharing, and the archaeological record. *Journal of Anthropological Archaeology*, 3(3), 235–257.
- Binford, L. R. (1985). Human ancestors: Changing views of their behavior. *Journal of Anthropological Archaeology*, 4(4), 292–327.
- Blumenschine, R. J., Marean, C. W., & Capaldo, S. D. (1996). Blind Tests of Inter-analyst Correspondence and Accuracy in the Identification of Cut Marks, Percussion Marks, and Carnivore Tooth Marks on Bone Surfaces. *Journal of Archaeological Science*, 23(4), 493–507.
- Bonnichsen, R. (1979). *Pleistocene Bone Technology in the Beringian Refugium*. Ottawa: University of Ottawa Press.
- Bovy, K. M., Etnier, M. A., Butler, V. L., Campbell, S. K., & Shaw, J. D. (2019). Using bone fragmentation records to investigate coastal human ecodynamics: A case study from Číxwicən (Washington State, USA). *Journal of Archaeological Science: Reports*, 23, 1168–1186.
- Bradfield, J., Forssman, T., Spindler, L., & Antonites, A. R. (2019). Identifying the animal species used to manufacture bone arrowheads in South Africa. *Archaeological and Anthropological Sciences*, 11(6), 2419–2434.
- Brain, C. K. (1969). The contribution of Namib Desert Hottentots to an understanding of australopithecine bone accumulations. *Scientific Papers of the Namib Desert Research Station*.

- Brain, C. K. (1981). *The hunters or the hunted?* University of Chicago Press.
- Brandt, L. Ø., Haase, K., & Collins, M. J. (2018). Species identification using ZooMS, with reference to the exploitation of animal resources in the medieval town of Odense. *Danish Journal of Archaeology*, 1–15.
- Brandt, L. Ø., Lillemark, M. R., Rytter, M., Collins, M. J., & Tøttrup, A. P. (2022). Next Generation Lab puts Denmark's past in the hands of its future. *Antiquity*, 96(385), 221–228.
- Brothwell, D., & Chaplin, R. E. (1972). The study of animal bones from archaeological sites. *Man; a Monthly Record of Anthropological Science*, 7(2), 325.
- Broughton, J. M. (2015). *Zooarchaeology* (pp. 849–853).
- Brown, S., Douka, K., Collins, M. J., & Richter, K. K. (2021). On the standardization of ZooMS nomenclature. *Journal of Proteomics*, 235, 104041.
- Brown, S., Higham, T., Slon, V., Pääbo, S., Meyer, M., Douka, K., Brock, F., Comeskey, D., Procopio, N., Shunkov, M., Derevianko, A., & Buckley, M. (2016). Identification of a new hominin bone from Denisova Cave, Siberia using collagen fingerprinting and mitochondrial DNA analysis. *Scientific Reports*, 6, 23559.
- Brown, S., Kozlikin, M., Shunkov, M., Derevianko, A., Higham, T., Douka, K., & Richter, K. K. (2021). Examining collagen preservation through glutamine deamidation at Denisova Cave. *Journal of Archaeological Science*, 133, 105454.
- Brown, S., Wang, N., Oertle, A., Kozlikin, M. B., Shunkov, M. V., Derevianko, A. P., Comeskey, D., Jope-Street, B., Harvey, V. L., Chowdhury, M. P., Buckley, M., Higham, T., & Douka, K. (2021). Zooarchaeology through the lens of collagen fingerprinting at Denisova Cave. *Scientific Reports*, 11(1), 15457.
- Brugal, J.-P. (1999). Étude de populations de grands Bovidés européens: intérêt pour la connaissance des comportements humains au Paléolithique. In Éditions APDCA (Ed.), *Le bison: gibier et moyen de subsistance des hommes du Paléolithique aux Paléoindiens des Grandes Plaines*. (pp. 85–104).
- Brugal, J.-P. (2017). TaphonomieS. In Edition des Archives Contemporaines (Ed.), *Taphonomie, Environnement et Archéologie* (p. 536). CNRS-INEE, Coll. Sciences Archéologiques.
- Buckley, M. (2018). Zooarchaeology by Mass Spectrometry (ZooMS) Collagen Fingerprinting for the Species Identification of Archaeological Bone Fragments. In C. M. Giovas & M. J. LeFebvre (Eds.), *Zooarchaeology in Practice: Case Studies in Methodology and Interpretation in Archaeofaunal Analysis* (pp. 227–247). Springer International Publishing.

- Buckley, M., Collins, M., Thomas-Oates, J., & Wilson, J. C. (2009). Species identification by analysis of bone collagen using matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry. *Rapid Communications in Mass Spectrometry: RCM*, 23(23), 3843–3854.
- Buckley, M., Harvey, V. L., & Chamberlain, A. T. (2017). Species identification and decay assessment of Late Pleistocene fragmentary vertebrate remains from Pin Hole Cave (Creswell Crags, UK) using collagen fingerprinting. *Boreas*.
- Buckley, M., & Kansa, S. W. (2011). Collagen fingerprinting of archaeological bone and teeth remains from Domuztepe, South Eastern Turkey. *Archaeological and Anthropological Sciences*, 3(3), 271–280.
- Buckley, M., Larkin, N., & Collins, M. (2011). Mammoth and Mastodon collagen sequences; survival and utility. *Geochimica et Cosmochimica Acta*, 75(7), 2007–2016.
- Burke, A. (2000). Hunting in the middle Palaeolithic. *International Journal of Osteoarchaeology*, 10(5), 281–285.
- Burke, P. (2004). *Languages and Communities in Early Modern Europe*. Cambridge University Press.
- Calvano, C. D., Rigante, E., Picca, R. A., Cataldi, T. R. I., & Sabbatini, L. (2020). An easily transferable protocol for in-situ quasi-non-invasive analysis of protein binders in works of art. *Talanta*, 215, 120882.
- Cappellini, E., Collins, M. J., & Gilbert, M. T. (2014). Biochemistry. Unlocking ancient protein palimpsests. *Science*, 343(6177), 1320–1322.
- Castel, J. C. (2011). Archéozoologie de l'Aurignacien de l'Abri Castanet (Sergeac, Dordogne, France): les fouilles 1994-1998. *Revue de Paléobiologie*, 30(2), 783–815.
- Champagne, F., Espitalie, R., Beckouche, S., Champagne, C., Laville, H., Marquet, J.-C., Mons, L., Mourer-Chauvire, C., Poplin, F., & Delporte, H. (1981). Le Piage, site préhistorique du Lot. *Mémoires de La Société Préhistorique Française Paris*, 15, 205.
- Charlton, S., Alexander, M., Collins, M., & Milner, N. (2016). Finding Britain's last hunter-gatherers: A new biomolecular approach to "unidentifiable" bone fragments utilising bone collagen. *Journal of Archaeological Science*, 73, 55–61.
- Chase, P. G. (1999). Bison in the context of complex utilization of faunal resources: a preliminary report on the Mousterian zooarchaeology of La Quina (Charente, France). *Le Bison: Gibier et Moyen de Subsistance Des Hommes Du Paléolithique Aux Paléoindiens Des Grandes Plaines*, 159–184.
- Child, A. M., & Pollard, A. M. (1992). A review of the applications of immunochemistry to archaeological bone. *Journal of Archaeological Science*, 19(1), 39–47.

- Cicatiello, P., Ntasi, G., Rossi, M., Marino, G., Giardina, P., & Birolo, L. (2018). Minimally Invasive and Portable Method for the Identification of Proteins in Ancient Paintings. *Analytical Chemistry*, 90(17), 10128–10133.
- Clark, J. L., & Speth, J. D. (2013). *Zooarchaeology and Modern Human Origins*. Springer Netherlands.
- Collins M, Buckley M, Grundy Hh, Thomas-Oates J, Wilson J. (2010). ZooMS: the collagen barcode and fingerprints. *Group (Saarland University, Germany)*, 1(2).
- Conard, N. J., Malina, M., & Münzel, S. C. (2009). New flutes document the earliest musical tradition in southwestern Germany. *Nature*, 460(7256), 737–740.
- Costamagno, S., Liliane, M., Cédric, B., Bernard, V., & Bruno, M. (2006). Les Pradelles (Marillac-le-Franc, France): A mousterian reindeer hunting camp? *Journal of Anthropological Archaeology*, 25(4), 466–484.
- Coutu, A. N., Taurozzi, A. J., Mackie, M., Jensen, T. Z. T., Collins, M. J., & Sealy, J. (2021). Palaeoproteomics confirm earliest domesticated sheep in southern Africa ca. 2000 BP. *Scientific Reports*, 11(1), 6631.
- Cowan, P. M., McGavin, S., & North, A. C. (1955). The polypeptide chain configuration of collagen. *Nature*, 176(4492), 1062–1064.
- David, F., & Enloe, J. G. (1993). L'exploitation des animaux sauvages de la fin du Paléolithique moyen au Magdalénien. In A. Apdca (Ed.), *Exploitation des animaux sauvages à travers le temps*. (pp. 29–47).
- Debénath, A., Jelinek, A. J., Armand, D., Chase, P. G., Dibble, H. L., & . E. (1998). Nouvelles fouilles à La Quina (Charente) : résultats préliminaires. *Gallia Préhistoire – Archéologie de La France Préhistorique, CNRS Éditions*, 40, 29–74.
- Dekker, J., Sinet-Mathiot, V., Spithoven, M., Smit, B., Wilcke, A., Welker, F., Verpoorte, A., & Soressi, M. (2021). Human and cervid osseous materials used for barbed point manufacture in Mesolithic Doggerland. *Journal of Archaeological Science: Reports*, 35, 102678.
- Delagnes, A., & Rendu, W. (2011). Shifts in Neandertal mobility, technology and subsistence strategies in western France. *Journal of Archaeological Science*, 38(8), 1771–1783.
- Delpéch, F. (2007). Le grand abri de la Ferrassie, source de réflexion sur la biostratigraphie d'un court moment du Pléistocène. *Arts et Cultures de La Préhistoire*, 303–314.
- Demarchi, B., Hall, S., Roncal-Herrero, T., Freeman, C. L., Woolley, J., Crisp, M. K., Wilson, J., Fotakis, A., Fischer, R., Kessler, B. M., Rakownikow Jersie-Christensen, R., Olsen, J. V., Haile, J., Thomas, J., Marean, C. W., Parkington, J., Presslee, S., Lee-Thorp, J., Ditchfield, P., ... Collins, M. J. (2016). Protein sequences bound to mineral surfaces persist into deep time. *eLife*, 5.

- de Perthes, B. (1847-1864). *Antiquités Celtiques et Antédiluviennes: Vols. Vols I, II, III*, (Treuttel et Wurtz, Derache, Dumoulin, Victor Didron (ed.)).
- d'Errico, F. (2003). The invisible frontier. A multiple species model for the origin of behavioral modernity. *Evolutionary Anthropology*, 12(4), 188–202.
- d'Errico, F., & Henshilwood, C. S. (2011). The origin of symbolically mediated behaviour. *Homo Symbolicus: The Dawn of Language, Imagination and Spirituality*, 49–74.
- d'Errico, F., Julien, M., Liolios, D., Vanhaeren, M., & Baffier, D. (2003). Many awls in our argument. Bone tool manufacture and use from the Chatelperronian and Aurignacian layers of the Grotte du Renne at Arcy-sur-Cur. *The Chronology of the Aurignacian and of the Transitional Technocomplexes. Dating, Stratigraphies, Cultural Implications*, 247–270.
- d'Errico, F., Vanhaeren, M., Barton, N., Bouzouggar, A., Mienis, H., Richter, D., Hublin, J.-J., McPherron, S. P., & Lozouet, P. (2009). Additional evidence on the use of personal ornaments in the Middle Paleolithic of North Africa. *Proceedings of the National Academy of Sciences*, 106(38), 16051–16056.
- d'Errico, Vanhaeren, & Henshilwood. (2009). From the origin of language to the diversification of languages. In J. Benjamins (Ed.), *Becoming Eloquent* (pp. 13–68). torrossa.com.
- Desmond, A., Barton, N., Bouzouggar, A., Douka, K., Fernandez, P., Humphrey, L., Morales, J., Turner, E., & Buckley, M. (2018). ZooMS identification of bone tools from the North African Later Stone Age. *Journal of Archaeological Science*, 98, 149–157.
- Devièse, T., Karavanić, I., Comeskey, D., Kubiak, C., Korlević, P., Hajdinjak, M., Radović, S., Procopio, N., Buckley, M., Pääbo, S., & Higham, T. (2017). Direct dating of Neanderthal remains from the site of Vindija Cave and implications for the Middle to Upper Paleolithic transition. *Proceedings of the National Academy of Sciences of the United States of America*, 114(40), 10606–10611.
- Dirrigl, J. R., & Frank, J. (2002). Differential identifiability between chosen North American gallinaceous skeletons and the effect of differential survivorship. *Acta Zoologica Cracoviensia*, 45.
- Discamps, E., Jaubert, J., & Bachellerie, F. (2011). Human choices and environmental constraints: deciphering the variability of large game procurement from Mousterian to Aurignacian times (MIS 5-3) in southwestern France. *Quaternary Science Reviews*, 30(19), 2755–2775.

- Domínguez-Rodrigo, M., Bunn, H. T., Mabulla, A. Z. P., Baquedano, E., UribeArrea, D., Pérez-González, A., Gidna, A., Yravedra, J., Díez-Martín, F., Egeland, C. P., Barba, R., Arriaza, M. C., Organista, E., & Ansón, M. (2014). On meat eating and human evolution: A taphonomic analysis of BK4b (Upper Bed II, Olduvai Gorge, Tanzania), and its bearing on hominin megafaunal consumption. *Quaternary International: The Journal of the International Union for Quaternary Research*, 322-323, 129–152.
- Domínguez-Rodrigo, M., Saladié, P., Cáceres, I., Huguet, R., Yravedra, J., Rodríguez-Hidalgo, A., Martín, P., Pineda, A., Marín, J., Gené, C., Aramendi, J., & Cobo-Sánchez, L. (2017). Use and abuse of cut mark analyses: The Rorschach effect. *Journal of Archaeological Science*, 86, 14–23.
- Driver, J. C., Bovy, K., Butler, V. L., Lupo, K. D., Lyman, R. L., & Otaola, C. (2011). Identification, Classification and Zooarchaeology. *Ethnobiology Letters*, 2, 19–39.
- Durocher, M., Grouard, S., Nicolas, V., Maestri, R., & Evin, A. (2022). Defining Fragmentation Patterns of Archaeological Bone Remains without Typologies: A Landmark-Based Approach on Rodent Mandibula. *Quaternary*, 5(1), 14.
- Ebsen, J. A., Haase, K., Larsen, R., Sommer, D. V. P., & Brandt, L. Ø. (2019). Identifying archaeological leather – discussing the potential of grain pattern analysis and zooarchaeology by mass spectrometry (ZooMS) through a case study involving medieval shoe parts from Denmark. *Journal of Cultural Heritage*, 39, 21–31.
- Eda, M., Morimoto, M., Mizuta, T., & Inoué, T. (2020). ZooMS for birds: Discrimination of Japanese archaeological chickens and indigenous pheasants using collagen peptide fingerprinting. *Journal of Archaeological Science: Reports*, 34, 102635.
- Efremov, J. A. (1940). Taphonomy : a new branch of geology. *Pan - Am. Geologist*, 74, 81–93.
- Evans, S., Briz i Godino, I., Álvarez, M., Rowsell, K., Collier, P., de Goodall, R. N. P., Mulville, J., Lacroux, A., Collins, M. J., & Speller, C. (2016). Using combined biomolecular methods to explore whale exploitation and social aggregation in hunter–gatherer–fisher society in Tierra del Fuego. *Journal of Archaeological Science: Reports*, 6, 757–767.
- Farizy, C., David, F., Jaubert, J., & Eisenmann, V. (1994). *Hommes et bisons du Paléolithique moyen à Mautan (Haute-Garonne)*. Paris: CNRS éditions,.
- Fernandez-Jalvo, Y., & Andrews, P. (2016). *Atlas of Taphonomic Identifications: 1001+ Images of Fossil and Recent Mammal Bone Modification*. Springer.
- Fewlass, H., Talamo, S., Wacker, L., Kromer, B., Tuna, T., Fagault, Y., Bard, E., McPherron, S. P., Aldeias, V., Maria, R., Martisius, N. L., Paskulin, L., Rezek, Z., Sinet-Mathiot, V., Sirakova, S., Smith, G. M., Spasov, R., Welker, F., Sirakov, N., ... Hublin, J.-J. (2020). A 14 C chronology for the Middle to Upper Palaeolithic transition at Bacho Kiro Cave, Bulgaria. *Nature Ecology & Evolution*, 1–8.

- Fiddymment, S., Goodison, N. J., Brenner, E., Signorello, S., Price, K., & Collins, M. J. (2021). Girding the loins? Direct evidence of the use of a medieval English parchment birthing girdle from biomolecular analysis. In *Royal Society Open Science* (Vol. 8, Issue 3).
- Fiddymment, S., Holsinger, B., Ruzzier, C., Devine, A., Binois, A., Albarella, U., Fischer, R., Nichols, E., Curtis, A., Cheese, E., Teasdale, M. D., Checkley-Scott, C., Milner, S. J., Rudy, K. M., Johnson, E. J., Vnouček, J., Garrison, M., McGrory, S., Bradley, D. G., & Collins, M. J. (2015). Animal origin of 13th-century uterine vellum revealed using noninvasive peptide fingerprinting. *Proceedings of the National Academy of Sciences of the United States of America*, 112(49), 15066–15071.
- Fisher, J. W. (1995). Bone surface modifications in zooarchaeology. *Journal of Archaeological Method and Theory*, 2(1), 7–68.
- Fu, Q., Hajdinjak, M., Moldovan, O. T., Constantin, S., Mallick, S., Skoglund, P., Patterson, N., Rohland, N., Lazaridis, I., Nickel, B., Viola, B., Prüfer, K., Meyer, M., Kelso, J., Reich, D., & Pääbo, S. (2015). An early modern human from Romania with a recent Neanderthal ancestor. *Nature*, 524(7564), 216–219.
- Gaudzinski, S. (1996). On bovid assemblages and their consequences for the knowledge of subsistence patterns in the Middle Palaeolithic. *Proceedings of the Prehistoric Society*, 62, 19–39.
- Gaudzinski, S. (2000). On the variability of Middle Palaeolithic procurement tactics: the case of Salzgitter Lebenstedt, northern Germany 1. *International Journal of Osteoarchaeology*.
- Gaudzinski, S. (2006). Monospecific or species-dominated faunal assemblages during the Middle Paleolithic in Europe. *Transitions before the Transition*.
- Gaudzinski, S., & Roebroeks, W. (2000). Adults only. Reindeer hunting at the middle palaeolithic site Salzgitter lebenstedt, northern Germany. *Journal of Human Evolution*, 38(4), 497–521.
- Gaudzinski-Windheuser, S., Kindler, L., Pop, E., Roebroeks, W., & Smith, G. (2014). The Eemian Interglacial lake-landscape at Neumark-Nord (Germany) and its potential for our knowledge of hominin subsistence strategies. *Quaternary International: The Journal of the International Union for Quaternary Research*, 331, 31–38.
- Gaudzinski-Windheuser, S., & Niven, L. (2009). Hominin subsistence patterns during the Middle and Late Paleolithic in northwestern Europe. *The Evolution of Hominin Diets*.
- Gaudzinski-Windheuser, S., & Roebroeks, W. (2011). On Neanderthal subsistence in last interglacial forested environments in Northern Europe. *Neanderthal Lifeways, Subsistence and Technology*, 61–71.
- Gifford-Gonzalez, D. (1991). Bones are not enough: Analogues, knowledge, and interpretive strategies in zooarchaeology. *Journal of Anthropological Archaeology*, 10(3), 215–254.
- Gifford-Gonzalez, D. (2018). The Emergence of Zooarchaeology. In D. Gifford-Gonzalez

- (Ed.), *An Introduction to Zooarchaeology* (pp. 19–50). Springer International Publishing.
- Granger, J.-M., & Lévêque, F. (1997). Parure castelperronienne et aurignacienne: étude de trois séries inédites de dents percées et comparaisons. *Comptes Rendus de l'Académie Des Sciences - Series IIA - Earth and Planetary Science*, 325(7), 537–543.
- Grayson, D. K. (1983). *The establishment of human antiquity*. New York: Academic Press.
- Grayson, D. K. (1984). *Quantitative Zooarchaeology*. Academic Press.
- Grayson, D. K., & Delpech, F. (2002). Specialized Early Upper Palaeolithic Hunters in Southwestern France? *Journal of Archaeological Science*, 29(12), 1439–1449.
- Grayson, D. K., & Delpech, F. (2003). Ungulates and the Middle-to-Upper Paleolithic transition at Grotte XVI (Dordogne, France). *Journal of Archaeological Science*, 30(12), 1633–1648.
- Grayson, D. K., & Delpech, F. (2006). *Was there increasing dietary specialization across the Middle-to-Upper Paleolithic transition in France?* na.
- Grayson, D. K., & Delpech, F. (2008). The large mammals of Roc de Combe (Lot, France): The Châtelperronian and Aurignacian assemblages. *Journal of Anthropological Archaeology*, 27(3), 338–362.
- Grayson, D. K., Delpech, F., Rigaud, J. P., & Simek, J. F. (2001). Explaining the development of dietary dominance by a single ungulate taxon at Grotte XVI, Dordogne, France. *Journal of Archaeological Science*.
- Gummesson, S., Molin, F., & Sjöström, A. (2019). The Spatial Organization of Bone Crafting During the Middle and Late Mesolithic at Ringsjöholm and Strandvägen in Sweden. *Journal of Field Archaeology*, 44(3), 165–179.
- Harvey, V. L., Daugnora, L., & Buckley, M. (2018). Species identification of ancient Lithuanian fish remains using collagen fingerprinting. *Journal of Archaeological Science*, 98, 102–111.
- Hedges, R. E. M. (2002). Bone diagenesis: an overview of processes. *Archaeometry*, 44(3), 319–328.
- Hedges, R. E. M., Millard, A. R., & Pike, A. W. G. (1995). Measurements and Relationships of Diagenetic Alteration of Bone from Three Archaeological Sites. *Journal of Archaeological Science*, 22(2), 201–209.
- Hendy, J. (2021). Ancient protein analysis in archaeology. *Science Advances*, 7(3). <https://doi.org/10.1126/sciadv.abb9314>
- Hendy, J., Welker, F., Demarchi, B., Speller, C., Warinner, C., & Collins, M. J. (2018). A guide to ancient protein studies. *Nature Ecology & Evolution*, 1.
- Henriksen, & Karsdal. (2016). Type I collagen. *Biochemistry of Collagens, Laminins and Elastin*, 1–11.
- Henshilwood, C. S., & Marean, C. W. (2003). The Origin of Modern Human Behavior: Critique of the Models and Their Test Implications. *Current Anthropology*, 44(5), 627–651.

- Heptner, V. G. (1989). *Mammals of the Soviet Union, Volume 2 Part 2 Carnivora (Hyenas and Cats)*. BRILL.
- Higham, T., Douka, K., Wood, R., Ramsey, C. B., Brock, F., Basell, L., Camps, M., Arrizabalaga, A., Baena, J., Barroso-Ruíz, C., Bergman, C., Boitard, C., Boscato, P., Caparrós, M., Conard, N. J., Draily, C., Froment, A., Galván, B., Gambassini, P., ... Jacobi, R. (2014). The timing and spatiotemporal patterning of Neanderthal disappearance. *Nature*, 512(7514), 306–309.
- Hublin, J.-J. (2012). The earliest modern human colonization of Europe [Review of *The earliest modern human colonization of Europe*]. *Proceedings of the National Academy of Sciences of the United States of America*, 109(34), 13471–13472.
- Hublin, J.-J. (2015). The modern human colonization of western Eurasia: when and where? *Quaternary Science Reviews*, 118, 194–210.
- Hublin, J.-J., Sirakov, N., Aldeias, V., Bailey, S., Bard, E., Delvigne, V., Endarova, E., Fagault, Y., Fewlass, H., Hajdinjak, M., Kromer, B., Krumov, I., Marreiros, J., Martisius, N. L., Paskulin, L., Sinet-Mathiot, V., Meyer, M., Pääbo, S., Popov, V., ... Tsanova, T. (2020). Initial Upper Palaeolithic Homo sapiens from Bacho Kiro Cave, Bulgaria. *Nature*, 581(7808), 299–302.
- Hublin, J. J., Spoor, F., Braun, M., Zonneveld, F., & Condemi, S. (1996). A late Neanderthal associated with Upper Palaeolithic artefacts. *Nature*, 381(6579), 224–226.
- Hynek, R., Kuckova, S., Hradilova, J., & Kodicek, M. (2004). Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry as a tool for fast identification of protein binders in color layers of paintings. *Rapid Communications in Mass Spectrometry: RCM*, 18(17), 1896–1900.
- Jaouen, K., Richards, M. P., Le Cabec, A., Welker, F., Rendu, W., Hublin, J.-J., Soressi, M., & Talamo, S. (2019). Exceptionally high $\delta^{15}\text{N}$ values in collagen single amino acids confirm Neandertals as high-trophic level carnivores. *Proceedings of the National Academy of Sciences of the United States of America*, 116(11), 4928–4933.
- Jaubert, J., Kervazo, B., Bahain, J. J., Brugal, J. P., & Chalard, P. (2005). *Coudoulous I (Tour-de-Faure, Lot), site du Pléistocène moyen en Quercy: bilan pluridisciplinaire*.
- Jaubert, J., Lorblanchet, M., Laville, H., Slott-Moller, R., Turq, A., & Brugat, J.-P. (1990). *Les chasseurs d'Aurochs de La Borde: Un site du Paléolithique moyen (Livernon, Lot)*. Éditions de la Maison des sciences de l'homme.
- Katzenberg, A. M., & Grauer, A. L. (2018). *Biological Anthropology of the Human Skeleton*. John Wiley & Sons.
- Kidwell, S. M., & Flessa, K. W. (1995). The Quality of the Fossil Record: Populations, Species, and Communities. *Annual Review of Ecology and Systematics*, 26, 269–299.

- Kirby, D. P., Buckley, M., Promise, E., Trauger, S. A., & Holdcraft, T. R. (2013). Identification of collagen-based materials in cultural heritage. *The Analyst*, 138(17), 4849–4858.
- Kirby, D. P., Manick, A., & Newman, R. (2020). Minimally Invasive Sampling of Surface Coatings for Protein Identification by Peptide Mass Fingerprinting: A Case Study with Photographs. *Journal of the American Institute for Conservation*, 59(3-4), 235–245.
- Klein, R. G. (1989). Why does skeletal part representation differ between smaller and larger bovids at klasies river mouth and other archeological sites? *Journal of Archaeological Science*, 16(4), 363–381.
- Klein, R. G. (1995). Anatomy, behavior, and modern human origins. *Journal of World Prehistory*, 9(2), 167–198.
- Klein, R. G. (2003). Whither the Neanderthals? *Science*, 299(5612), 1525–1527.
- Klein, R. G. (2008). Out of Africa and the evolution of human behavior. *Evolutionary Anthropology*, 17(6), 267–281.
- Klein, R. G., & Cruz-Urbe, K. (1984). *The Analysis of Animal Bones from Archeological Sites*. University of Chicago Press.
- Klein, R. G., Cruz-Urbe, K., & Milo, R. G. (1999). Skeletal Part Representation in Archaeofaunas: Comments on “Explaining the ‘Klasies Pattern’: Kua Ethnoarchaeology, the Die Kelders Middle Stone Age Archaeofauna, Long Bone Fragmentation and Carnivore Ravaging” by Bartram & Marean. *Journal of Archaeological Science*, 26(9), 1225–1234.
- Kuckova, S., Hynek, R., & Kodicek, M. (2007). Identification of proteinaceous binders used in artworks by MALDI-TOF mass spectrometry. *Analytical and Bioanalytical Chemistry*, 388(1), 201–206.
- Lam, Y. M., & Pearson, O. M. (2005). Bone density studies and the interpretation of the faunal record. *Evolutionary Anthropology*, 14(3), 99–108.
- Lawrence, D. R. (1968). Taphonomy and Information Losses in Fossil Communities. *GSA Bulletin*, 79(10), 1315–1330.
- Le Cabec, A., & Toussaint, M. (2017). Impacts of curatorial and research practices on the preservation of fossil hominid remains. *Journal of Anthropological Sciences = Rivista Di Antropologia: JASS / Istituto Italiano Di Antropologia*, 95, 7–34.
- Lee Lyman, R. (1994a). Quantitative Units and Terminology in Zooarchaeology. *American Antiquity*, 59(1), 36–71.
- Lee Lyman, R. (1994b). *Vertebrate Taphonomy*. Cambridge University Press.
- Lee Lyman, R. (2008). *Quantitative Paleozoology*. Cambridge University Press.
- Lubbock, J. (1865). *Pre-Historic Times, as illustrated by Ancient Remains, and the Manners and Customs of modern savages*. London: Williamsn and Norgate.

- Lyman, R. L. (1987). Archaeofaunas and butchery studies: a taphonomic perspective. *Advances in Archaeological Method and Theory*.
- Lyman, R. L. (2002). Taxonomic identification of zooarchaeological remains. *The Review of Archaeology*, 23(2), 13–20.
- Lyman, R. L. (2004). The concept of equifinality in taphonomy. *Journal of Taphonomy*, 2(1), 15–26.
- Madgwick, R., & Mulville, J. (2012). Investigating variation in the prevalence of weathering in faunal assemblages in the UK: A multivariate statistical approach. *International Journal of Osteoarchaeology*, 22(5), 509–522.
- Madgwick, R., & Mulville, J. (2015). Reconstructing depositional histories through bone taphonomy: extending the potential of faunal data. *Journal of Archaeological Science*, 53, 255–263.
- Marean, C. W. (1991). Measuring the post-depositional destruction of bone in archaeological assemblages. *Journal of Archaeological Science*, 18(6), 677–694.
- Marean, C. W., Abe, Y., Frey, C. J., & Randall, R. C. (2000). Zooarchaeological and taphonomic analysis of the Die Kelders Cave 1 layers 10 and 11 Middle Stone Age larger mammal fauna. *Journal of Human Evolution*, 38(1), 197–233.
- Marean, C. W., Abe, Y., Nilssen, P. J., & Stone, E. C. (2001). Estimating the minimum number of skeletal elements (MNE) in zooarchaeology: a review and a new image-analysis GIS approach. *American Antiquity*, 66(2), 333–348.
- Marean, C. W., & Assefa, Z. (1999). Zooarchaeological evidence for the faunal exploitation behavior of Neandertals and early modern humans. *Evolutionary Anthropology: Issues, News, and Reviews: Issues, News, and Reviews*, 8(1), 22–37.
- Marean, C. W., Bar-Matthews, M., Bernatchez, J., Fisher, E., Goldberg, P., Herries, A. I. R., Jacobs, Z., Jerardino, A., Karkanas, P., Minichillo, T., Nilssen, P. J., Thompson, E., Watts, I., & Williams, H. M. (2007). Early human use of marine resources and pigment in South Africa during the Middle Pleistocene. *Nature*, 449(7164), 905–908.
- Marean, C. W., & Kim, S. Y. (1998). Mousterian large-mammal remains from kobeh cave behavioral implications for neanderthals and early modern humans. *Current Anthropology*, 39(S1), S79–S114.
- Marshall, F., & Pilgram, T. (1993). NISP vs. MNI in Quantification of Body-Part Representation. *American Antiquity*, 58(2), 261–269.
- Martisius, N. L., Dogandžić, T., Lenoir, M., Mcpherron, S. P., & Steele, T. E. (2015). Neandertal Subsistence at the Late Mousterian Site of Abri Peyrony, France. *Small*, 50, 3B.

- Martisius, N. L., Spasov, R., Smith, G. M., Endarova, E., Sinet-Mathiot, V., Welker, F., Aldeias, V., Horta, P., Marreiros, J., Rezek, Z., McPherron, S. P., Sirakov, N., Sirakova, S., Tsanova, T., & Hublin, J.-J. (2022). Initial Upper Paleolithic bone technology and personal ornaments at Bacho Kiro Cave (Bulgaria). *Journal of Human Evolution*, 167, 103198.
- Martisius, N. L., Welker, F., Dogandžić, T., Grote, M. N., Rendu, W., Sinet-Mathiot, V., Wilcke, A., McPherron, S. J. P., Soressi, M., & Steele, T. E. (2020). Non-destructive ZooMS identification reveals strategic bone tool raw material selection by Neandertals. *Scientific Reports*, 10(1), 7746.
- McBrearty, S., & Brooks, A. S. (2000). The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution*, 39(5), 453–563.
- McCormack, J., Bourgon, N., Sinet-Mathiot, V., Rezek, Z., Smith, G. M., Hublin, J.-J., Dabain, M., & Fewlass, H. (2022). Combining collagen extraction with mineral Zn isotope analyses from a single sample for robust palaeoecological investigations. *Archaeological and Anthropological Sciences*, 14(7), 137.
- McGrath, K., Rowsell, K., Gates St-Pierre, C., Tedder, A., Foody, G., Roberts, C., Speller, C., & Collins, M. (2019). Identifying Archaeological Bone via Non-Destructive ZooMS and the Materiality of Symbolic Expression: Examples from Iroquoian Bone Points. *Scientific Reports*, 9(1), 11027.
- Mellars, P. (1973). The Character of the Middle-up per Paleolithic Transition in south-west France. *The Explanation of Culture Change, Models in Prehistory*, 225–276.
- Mellars, P. (1989). Major Issues in the Emergence of Modern Humans. *Current Anthropology*, 30(3), 349–385.
- Mellars, P. (1996a). The Emergence of Biologically Modern Populations in Europe: A Social and Cognitive Revolution'? *PROCEEDINGS-BRITISH ACADEMY*, 88, 179–202.
- Mellars, P. (1996b). *The Neanderthal Legacy: An Archaeological Perspective from Western Europe*. Princeton University Press.
- Mellars, P. (2004). Neanderthals and the modern human colonization of Europe. *Nature*, 432(7016), 461–465.
- Mellars, P. A. (1989). *Technological changes at the Middle-Upper Palaeolithic transition: Economic, social, and cognitive perspectives*. In (P. Mellars & CB Stringer, Eds) *The Human Revolution: Behavioral and Biological Perspectives on the Origins of Modern Humans*. Edinburgh: Edinburgh University Press.
- Mellars, P. A. (2004). Reindeer specialization in the early Upper Palaeolithic: the evidence from south west France. *Journal of Archaeological Science*, 31(5), 613–617.
- Morin, E. (2004). *Late Pleistocene population interaction in western Europe and modern human origins: New insights based on the faunal remains from Saint-Césaire, southwestern France*. University of Michigan Ann Arbor.

- Morin, E. (2008). Evidence for declines in human population densities during the early Upper Paleolithic in western Europe. *Proceedings of the National Academy of Sciences of the United States of America*, 105(1), 48–53.
- Morin, E. (2010). Taphonomic implications of the use of bone as fuel. *Palethnologie*, 2, 209–217.
- Morin, E. (2012). *Reassessing Paleolithic Subsistence: The Neandertal and Modern Human Foragers of Saint-Césaire*. Cambridge University Press.
- Morin, E. (2020). Rethinking the emergence of bone grease procurement. *Journal of Anthropological Archaeology*, 59, 101178.
- Morin, E., & Ready, E. (2013). Foraging Goals and Transport Decisions in Western Europe during the Paleolithic and Early Holocene. In J. L. Clark & J. D. Speth (Eds.), *Zooarchaeology and Modern Human Origins: Human Hunting Behavior during the Later Pleistocene* (pp. 227–269). Springer Netherlands.
- Morin, E., Ready, E., Boileau, A., Beauval, C., & Coumont, M.-P. (2017a). Problems of Identification and Quantification in Archaeozoological Analysis, Part I: Insights from a Blind Test. *Journal of Archaeological Method and Theory*, 24(3), 886–937.
- Morin, E., Ready, E., Boileau, A., Beauval, C., & Coumont, M.-P. (2017b). Problems of Identification and Quantification in Archaeozoological Analysis, Part II: Presentation of an Alternative Counting Method. *Journal of Archaeological Method and Theory*, 24(3), 938–973.
- Morin, E., & Soulier, M.-C. (2017). New criteria for the archaeological identification of bone grease processing. *American Antiquity*, 82(1), 96–122.
- Morin, E., Speth, J. D., & Lee-Thorp, J. (2016). Middle Palaeolithic diets: A critical examination of the evidence. In *The Oxford handbook of the archaeology of diet* (pp. 1–33).
- Müller, R. T., Garcia, M. S., Da-Rosa, Á. A. S., & Dias-da-Silva, S. (2018). Under pressure: Effect of sedimentary compression on the iliac morphology of early sauropodomorphs. *Journal of South American Earth Sciences*, 88, 345–351.
- Münzel, S. C., & Conard, N. J. (2004). Change and continuity in subsistence during the Middle and Upper Palaeolithic in the Ach Valley of Swabia(south-west Germany). *International Journal of Osteoarchaeology*, 14(34), 225–243.
- Naihui, W., Samantha, B., Peter, D., Sandra, H., Maxim, K., Sindy, L., Oshan, W., Stefano, G., Michael, C., Liora, H. K., Matthew, S., Glenn, S., Michael, S., Kristine, R. K., & Katerina, D. (2021). Testing the efficacy and comparability of ZooMS protocols on archaeological bone. *Journal of Proteomics*, 233, 104078.
- Némethy, G., & Scheraga, H. A. (1986). Stabilization of collagen fibrils by hydroxyproline. *Biochemistry*, 25(11), 3184–3188.

- Nielsen-Marsh, C. M., Smith, C. I., Jans, M. M. E., Nord, A., Kars, H., & Collins, M. J. (2007). Bone diagenesis in the European Holocene II: taphonomic and environmental considerations. *Journal of Archaeological Science*, 34(9), 1523–1531.
- Niven, L. (2007). From carcass to cave: large mammal exploitation during the Aurignacian at Vogelherd, Germany. *Journal of Human Evolution*, 53(4), 362–382.
- Niven, L. (2013). A diachronic evaluation of neanderthal Cervid exploitation and site use at Pech de l'azé IV, France. In *Vertebrate Paleobiology and Paleoanthropology* (pp. 151–161). Springer Netherlands.
- Niven, L., Steele, T. E., Rendu, W., Mallye, J.-B., McPherron, S. P., Soressi, M., Jaubert, J., & Hublin, J.-J. (2012). Neandertal mobility and large-game hunting: The exploitation of reindeer during the Quina Mousterian at Chez-Pinaud Jonzac (Charente-Maritime, France). *Journal of Human Evolution*, 63(4), 624–635.
- Noble, W., & Davidson, I. (1991). The Evolutionary Emergence of Modern Human Behaviour: Language and its Archaeology. *Man*, 26(2), 223–253.
- Nowell, A. (2010). Defining behavioral modernity in the context of Neandertal and anatomically modern human populations. *Annual Review of Anthropology*, 39(1), 437–452.
- O'Driscoll, C. A., & Thompson, J. C. (2018). The origins and early elaboration of projectile technology. *Evolutionary Anthropology*, 27(1), 30–45.
- Olsen, S. J. (1971). *Zooarchaeology: animal bones in archaeology and their interpretation* (Vol. 1). Addison-Wesley Publishing Company.
- Olsen, S. L., & Shipman, P. (1988). Surface modification on bone: Trampling versus butchery. *Journal of Archaeological Science*, 15(5), 535–553.
- Ostrom, P. H., Schall, M., Gandhi, H., Shen, T.-L., Hauschka, P. V., Strahler, J. R., & Gage, D. A. (2000). New strategies for characterizing ancient proteins using matrix-assisted laser desorption ionization mass spectrometry. *Geochimica et Cosmochimica Acta*, 64(6), 1043–1050.
- Outram, A. K. (2001). A New Approach to Identifying Bone Marrow and Grease Exploitation: Why the “Indeterminate” Fragments should not be Ignored. *Journal of Archaeological Science*, 28(4), 401–410.
- Outram, A. K. (2002). Bone fracture and within-bone nutrients: an experimentally based method for investigating levels of marrow extraction. *McDonald Institute for Archaeological Research*.
- Pappin, D. J., Hojrup, P., & Bleasby, A. J. (1993). Rapid identification of proteins by peptide-mass fingerprinting. *Current Biology: CB*, 3(6), 327–332.
- Patou-Mathis, M. (2000). Neanderthal subsistence behaviours in Europe. *International Journal of Osteoarchaeology*, 10(5), 379–395.

- Peres, T. M. (2010). Methodological Issues in Zooarchaeology. In A. M. VanDerwarker & T. M. Peres (Eds.), *Integrating Zooarchaeology and Paleoethnobotany: A Consideration of Issues, Methods, and Cases* (pp. 15–36). Springer New York.
- Pétillon, J.-M., Chauvière, F.-X., Speller, C., McGrath, K., Rodrigues, A. S. L., Charpentier, A., & Baleux, F. (2019). A Gray Whale in Magdalenian Perigord. Species identification of a bone projectile point from La Madeleine (Dordogne, France) using collagen fingerprinting. *Paléo*, 30-1, 230–242.
- Pickering, T. R., Egeland, C. P., Schnell, A. G., Osborne, D. L., & Enk, J. (2006). Success in Identification of Experimentally Fragmented Limb Bone Shafts: Implications for Estimates of Skeletal Element Abundance in Archaeofaunas. *Anthropology Faculty Publications*.
- Pokines, J. T., King, R. E., Graham, D. D., Costello, A. K., Adams, D. M., Pendray, J. M., Rao, K., & Siwek, D. (2016). The effects of experimental freeze-thaw cycles to bone as a component of subaerial weathering. *Journal of Archaeological Science: Reports*, 6, 594–602.
- Pothier Bouchard, G., Riel-Salvatore, J., Negrino, F., & Buckley, M. (2020). Archaeozoological, taphonomic and ZooMS insights into The Protoaurignacian faunal record from Riparo Bombrini. *Quaternary International: The Journal of the International Union for Quaternary Research*, 551, 243–263.
- Prüfer, K., Racimo, F., Patterson, N., Jay, F., Sankararaman, S., Sawyer, S., Heinze, A., Renaud, G., Sudmant, P. H., de Filippo, C., Li, H., Mallick, S., Dannemann, M., Fu, Q., Kircher, M., Kuhlwilm, M., Lachmann, M., Meyer, M., Ongyerth, M., ... Pääbo, S. (2014). The complete genome sequence of a Neanderthal from the Altai Mountains. *Nature*, 505(7481), 43–49.
- Reitz, E. J., Reitz, E., & Wing, E. S. (1999). *Zooarchaeology*. Cambridge University Press.
- Reitz, E. J., & Wing, E. S. (2008). *Zooarchaeology*. Cambridge University Press.
- Rendu, W. (2007). *Planification des activités de subsistance au sein du territoire des derniers Moustériens Cémento-chronologie et approche archéozoologique de gisements du Paléolithique moyen (Pech-de-l'Azé I, La Quina, Mauran) et Paléolithique supérieur ancien (Isturitz)*. Université Bordeaux 1.
- Rendu, W. (2010). Hunting behavior and Neanderthal adaptability in the Late Pleistocene site of Pech-de-l'Azé I. *Journal of Archaeological Science*, 37(8), 1798–1810.
- Rendu, W., & Armand, D. (2009). Saisonnalité de prédation du Bison du gisement moustérien de la Quina (Gardes-le-Pontaroux, Charente), niveau 6c. Apport à la compréhension des comportements de subsistance. *Bulletin de La Société Préhistorique Française*, 106(4), 679–690.

- Rendu, W., Costamagno, S., Meignen, L., & Soulier, M.-C. (2012). Monospecific faunal spectra in Mousterian contexts: Implications for social behavior. *Quaternary International: The Journal of the International Union for Quaternary Research*, 247, 50–58.
- Rendu, W., Renou, S., Soulier, M.-C., Rigaud, S., Roussel, M., & Soressi, M. (2019). Subsistence strategy changes during the Middle to Upper Paleolithic transition reveals specific adaptations of Human Populations to their environment. *Scientific Reports*, 9(1), 15817.
- Rich, A., & Crick, F. H. C. (1955). The Structure of Collagen. *Nature*, 176(4489), 915–916.
- Richards, M. P., Pettitt, P. B., Stiner, M. C., & Trinkaus, E. (2001). Stable isotope evidence for increasing dietary breadth in the European mid-Upper Paleolithic. *Proceedings of the National Academy of Sciences of the United States of America*, 98(11), 6528–6532.
- Richards, M. P., Taylor, G., Steele, T., McPherron, S. P., Soressi, M., Jaubert, J., Orschiedt, J., Mallye, J. B., Rendu, W., & Hublin, J. J. (2008). Isotopic dietary analysis of a Neanderthal and associated fauna from the site of Jonzac (Charente-Maritime), France. *Journal of Human Evolution*, 55(1), 179–185.
- Richter, K. K., Codlin, M. C., Seabrook, M., & Warinner, C. (2022). A primer for ZooMS applications in archaeology. *Proceedings of the National Academy of Sciences of the United States of America*, 119(20), e2109323119.
- Rivals, F., Bocherens, H., Camarós, E., & Rosell, J. (2022). Chapter 3 - Diet and ecological interactions in the Middle and Late Pleistocene. In F. Romagnoli, F. Rivals, & S. Benazzi (Eds.), *Updating Neanderthals* (pp. 39–54). Academic Press.
- Rogers, A. R. (2000). On Equifinality in Faunal Analysis. *American Antiquity*, 65(4), 709–723.
- Roussel, M. (2013). Méthodes et rythmes du débitage laminaire au Châtelperronien : comparaison avec le Protoaurignacien. *Comptes Rendus. Palevol*, 12(4), 233–241.
- Ruebens, K., McPherron, S. J. P., & Hublin, J.-J. (2015). On the local Mousterian origin of the Châtelperronian: Integrating typo-technological, chronostratigraphic and contextual data. *Journal of Human Evolution*, 86, 55–91.
- Ruebens, K., Sinet-Mathiot, V., Talamo, S., Smith, G. M., Welker, F., Hublin, J.-J., & McPherron, S. P. (2022). The Late Middle Palaeolithic Occupation of Abri du Maras (Layer 1, Neronian, Southeast France): Integrating Lithic Analyses, ZooMS and Radiocarbon Dating to Reconstruct Neanderthal Hunting Behaviour. *Journal of Paleolithic Archaeology*, 5(1), 4.
- Ruffini-Ronzani, N., Nieus, J.-F., Soncin, S., Hickinbotham, S., Dieu, M., Bouhy, J., Charles, C., Ruzzier, C., Falmagne, T., Hermand, X., Collins, M. J., & Deparis, O. (2021). A biocodicological analysis of the medieval library and archive from Orval Abbey, Belgium. *Royal Society Open Science*, 8(6), 210210.

- Runge, A. K. W., Hendy, J., Richter, K. K., Masson-MacLean, E., Britton, K., Mackie, M., McGrath, K., Collins, M., Cappellini, E., & Speller, C. (2021). Palaeoproteomic analyses of dog palaeofaeces reveal a preserved dietary and host digestive proteome. *Proceedings. Biological Sciences / The Royal Society*, 288(1954), 20210020.
- Rüther, P. L., Husic, I. M., Bangsgaard, P., Gregersen, K. M., Pantmann, P., Carvalho, M., Godinho, R. M., Friedl, L., Cascalheira, J., Taurozzi, A. J., Jørkov, M. L. S., Benedetti, M. M., Haws, J., Bicho, N., Welker, F., Cappellini, E., & Olsen, J. V. (2022). SPIN enables high throughput species identification of archaeological bone by proteomics. *Nature Communications*, 13(1), 2458.
- Rybczynski, N., Gosse, J. C., Harington, C. R., Wogelius, R. A., Hidy, A. J., & Buckley, M. (2013). Mid-Pliocene warm-period deposits in the High Arctic yield insight into camel evolution. *Nature Communications*, 4, 1550.
- Sánchez Goñi, M. F. (2022). Chapter 2 - The climatic and environmental context of the Late Pleistocene. In F. Romagnoli, F. Rivals, & S. Benazzi (Eds.), *Updating Neanderthals* (pp. 17–38). Academic Press.
- Sánchez Goñi, M. F., Bard, E., Landais, A., Rossignol, L., & d'Errico, F. (2013). Air–sea temperature decoupling in western Europe during the last interglacial–glacial transition. *Nature Geoscience*, 6(10), 837–841.
- Sekhr, A. (1998). *Etude archéozoologie des niveaux aurignaciens (couches 14 à 6) et de la base des niveaux gravettiens (niveaux X à T4) de l'Abri Pataud (les Eyzies, Dordogne) : Paléoécologie, taphonomie, palethnographie*. Paris, Muséum national d'histoire naturelle.
- Shea, J. J. (2009). The Impact of Projectile Weaponry on Late Pleistocene Hominin Evolution. In J.-J. Hublin & M. P. Richards (Eds.), *The Evolution of Hominin Diets: Integrating Approaches to the Study of Palaeolithic Subsistence* (pp. 189–199). Springer Netherlands.
- Shoulders, M. D., & Raines, R. T. (2009). Collagen structure and stability. *Annual Review of Biochemistry*, 78, 929–958.
- Sinet-Mathiot, V., Martisius, N. L., Schulz-Kornas, E., van Casteren, A., Tsanova, T. R., Sirakov, N., Spasov, R., Welker, F., Smith, G. M., & Hublin, J.-J. (2021). The effect of eraser sampling for proteomic analysis on Palaeolithic bone surface microtopography. *Scientific Reports*, 11(1), 23611.
- Sinet-Mathiot, V., Smith, G. M., Romandini, M., Wilcke, A., Peresani, M., Hublin, J.-J., & Welker, F. (2019). Combining ZooMS and zooarchaeology to study Late Pleistocene hominin behaviour at Fumane (Italy). *Scientific Reports*, 9(1), 12350.

- Sinet-Mathiot, V., Rendu, W., Steele, T.E., Spasov R., Madelaine, S., Renou, S., Soulier, M.-C., Martisius, N.L., Aldeias, V., Endarova, E., Goldberg, P., McPherron, S.J.P., Rezek, Z., Sandgathe, D., Sirakov, N., Sirakova, S., Soressi, M., Tsanova, T., Turq, A., Hublin, J.-J., Welker, F., Smith, G.M. (under review) Identifying the unidentified fauna enhances insights into hominin subsistence strategies during the Middle to Upper Palaeolithic transition. *Archaeological and Anthropological Sciences*.
- Smith, A. B., & Poggenpoel, C. (1988). The technology of bone tool fabrication in the southwestern Cape, South Africa. *World Archaeology*, 20(1), 103–115.
- Smith, G. M. (2015). Neanderthal megafaunal exploitation in Western Europe and its dietary implications: a contextual reassessment of La Cotte de St Brelade (Jersey). *Journal of Human Evolution*, 78, 181–201.
- Smith, G. M., Spasov, R., Martisius, N. L., Sinet-Mathiot, V., Aldeias, V., Rezek, Z., Ruebens, K., Pederzani, S., McPherron, S. P., Sirakova, S., Sirakov, N., Tsanova, T., & Hublin, J.-J. (2021). Subsistence behavior during the Initial Upper Paleolithic in Europe: Site use, dietary practice, and carnivore exploitation at Bacho Kiro Cave (Bulgaria). *Journal of Human Evolution*, 161, 103074.
- Soressi, M. (2004). From Mousterian of acheulian tradition type A to type B: technical tradition, raw material, task, or settlement dynamic changes? In *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age*, vol. 2 (pp. 343–366). Kerns.
- Soressi, M., & Roussel, M. (2014). European Middle-to-Upper Palaeolithic transitional industries: Châtelperronian. In Springer (Ed.), *Encyclopedia of global archaeology*. (pp. 2679–2693).
- Soulier, M.-C. (2013). *Entre alimentaire et technique : l'exploitation animale aux débuts du paléolithique supérieur : stratégies de subsistance et chaînes opératoires de traitement du gibier à Isturitz, La Quina aval, Roc-de-Combe et Les Abeilles*. Toulouse 2.
- Soulier, M.-C., & Costamagno, S. (2017). Let the cutmarks speak! Experimental butchery to reconstruct carcass processing. *Journal of Archaeological Science: Reports*, 11, 782–802.
- Speth. (2004). Hunting pressure, subsistence intensification, and demographic change in the Levantine Late Middle Paleolithic. *Human Paleoecology in the Levantine Corridor*.
- Stanford, C. B. (1995). Chimpanzee Hunting Behavior and Human Evolution. *American Scientist*, 83(3), 256–261.
- Steele, T. E. (2004). Variation in mortality profiles of red deer(*Cervus elaphus*) in Middle Palaeolithic assemblages from western Europe. *International Journal of Osteoarchaeology*, 14(34), 307–320.
- Steele, T. E. (2015). The contributions of animal bones from archaeological sites: the past and future of zooarchaeology. *Journal of Archaeological Science*, 56, 168–176.

- Stiner, M. C. (1994). *Honor among thieves: a zooarchaeological study of Neandertal ecology*. 937(7).
- Stiner, M. C. (2001). Thirty years on the “Broad Spectrum Revolution” and paleolithic demography. *Proceedings of the National Academy of Sciences*, 98(13), 6993–6996.
- Stiner, M. C., Munro, N. D., & Surovell, T. A. (2000). The Tortoise and the Hare: Small-Game Use, the Broad-Spectrum Revolution, and Paleolithic Demography. *Current Anthropology*, 41(1), 39–79.
- Straus, L. G. (2013). Iberian Archaeofaunas and Hominin Subsistence during Marine Isotope Stages 4 and 3. In J. L. Clark & J. D. Speth (Eds.), *Zooarchaeology and Modern Human Origins: Human Hunting Behavior during the Later Pleistocene* (pp. 97–128). Springer Netherlands.
- Szpak, P. (2011). Fish bone chemistry and ultrastructure: implications for taphonomy and stable isotope analysis. *Journal of Archaeological Science*, 38(12), 3358–3372.
- Tattersall, I. (1995). *The Fossil Trail: How We Know what We Think We Know about Human Evolution*. Oxford University Press.
- Teasdale, M. D., Fiddymont, S., Vnouček, J., Mattiangeli, V., Speller, C., Binois, A., Carver, M., Dand, C., Newfield, T. P., Webb, C. C., Bradley, D. G., & Collins, M. J. (2017). The York Gospels: a 1000-year biological palimpsest. *Royal Society Open Science*, 4(10), 170988.
- Terlato, G., Livraghi, A., Romandini, M., & Peresani, M. (2019). Large bovids on the Neanderthal menu: Exploitation of *Bison priscus* and *Bos primigenius* in northeastern Italy. *Journal of Archaeological Science: Reports*, 25, 129–143.
- Teyssandier, N., Bon, F., & Bordes, J.-G. (2010). WITHIN PROJECTILE RANGE: Some Thoughts on the Appearance of the Aurignacian in Europe. *Journal of Anthropological Research*, 66(2), 209–229.
- Théry-Parisot, I., Costamagno, S., Brugal, J.-P., Fosse, P., & Guilbert, R. (2005). The use of bone as fuel during the Palaeolithic, experimental study of bone combustible properties. *The Archaeology of Milk and Fats*, 50–59.
- Todd, L. C., & Rapson, D. J. (1988). Long bone fragmentation and interpretation of faunal assemblages: Approaches to comparative analysis. *Journal of Archaeological Science*, 15(3), 307–325.
- Tomasso, A., Rots, V., Purdue, L., Beyries, S., Buckley, M., Cheval, C., Cnats, D., Coppe, J., Julien, M.-A., Grenet, M., Lepers, C., M’hamdi, M., Simon, P., Sorin, S., & Porraz, G. (2018). Gravettian weaponry: 23,500-year-old evidence of a composite barbed point from Les Prés de Laure (France). *Journal of Archaeological Science*.
- Trinkaus, E. (1989). *The Emergence of Modern Humans: Biocultural Adaptations in the Later Pleistocene*. CUP Archive.

- Upex, B., & Dobney, K. (2020). Vertebrate Zooarchaeology. In *Archaeological Science: An Introduction* (pp. 215–232). Cambridge University Press.
- van Doorn, N. L., Hollund, H., & Collins, M. J. (2011). A novel and non-destructive approach for ZooMS analysis: ammonium bicarbonate buffer extraction. *Archaeological and Anthropological Sciences*, 3(3), 281.
- van Doorn, N. L., Wilson, J., Hollund, H., Soressi, M., & Collins, M. J. (2012). Site-specific deamidation of glutamine: a new marker of bone collagen deterioration. *Rapid Communications in Mass Spectrometry: RCM*, 26(19), 2319–2327.
- Vanhaeren, M., & d'Errico, F. (2006). Aurignacian ethno-linguistic geography of Europe revealed by personal ornaments. *Journal of Archaeological Science*, 33(8), 1105–1128.
- Vettese, D., Blasco, R., Cáceres, I., Gaudzinski-Windheuser, S., Moncel, M.-H., Hohenstein, U. T., & Daujeard, C. (2020). Towards an understanding of hominin marrow extraction strategies: a proposal for a percussion mark terminology. *Archaeological and Anthropological Sciences*, 12(2), 48.
- Villa, P., Castel, J.-C., Beauval, C., Bourdillat, V., & Goldberg, P. (2004). Human and carnivore sites in the European Middle and Upper Paleolithic: similarities and differences in bone modification and fragmentation. *Revue de Paléobiologie*, 23(2), 705–730.
- Villa, P., & Mahieu, E. (1991). Breakage patterns of human long bones. *Journal of Human Evolution*, 21(1), 27–48.
- Vnouček, J., Fiddymont, S., Quandt, A., Rabitsch, S., Collins, M., & Hofmann, C. (2020). The parchment of the Vienna Genesis: characteristics and manufacture. *The Vienna Genesis Material Analysis and Conservation of a Late Antique Illuminated Manuscript on Purple Parchment*, 35–70.
- von Holstein, I. C. C., Ashby, S. P., van Doorn, N. L., Sachs, S. M., Buckley, M., Meiri, M., Barnes, I., Brundle, A., & Collins, M. J. (2014). Searching for Scandinavians in pre-Viking Scotland: molecular fingerprinting of Early Medieval combs. *Journal of Archaeological Science*, 41, 1–6.
- Vuorio, E., & de Crombrughe, B. (1990). The family of collagen genes. *Annual Review of Biochemistry*, 59, 837–872.
- Wadley, L. (2006). Revisiting cultural modernity and the role of ochre in the Middle Stone Age. *The Prehistory of Africa: Tracing the Lineage of Modern*.
- Wadley, L. (2001). What is Cultural Modernity? A General View and a South African Perspective from Rose Cottage Cave. *Cambridge Archaeological Journal*, 11(2), 201–221.
- Wadley, L. (2010). Compound-Adhesive Manufacture as a Behavioral Proxy for Complex Cognition in the Middle Stone Age. *Current Anthropology*, 51(S1), S111–S119.

- Warinner, C., Korzow Richter, K., & Collins, M. J. (2022). Paleoproteomics. *Chemical Reviews*, 122(16), 13401–13446.
- Welker, F. (2017). *The palaeoproteomic identification of pleistocene hominin skeletal remains: Towards a biological understanding of the middle to upper palaeolithic transition* [Phd]. Universiteit.
- Welker, F. (2018). Palaeoproteomics for human evolution studies. *Quaternary Science Reviews*, 190, 137–147.
- Welker, F., Collins, M. J., Thomas, J. A., Wadsley, M., Brace, S., Cappellini, E., Turvey, S. T., Reguero, M., Gelfo, J. N., Kramarz, A., Burger, J., Thomas-Oates, J., Ashford, D. A., Ashton, P. D., Rowsell, K., Porter, D. M., Kessler, B., Fischer, R., Baessmann, C., ... MacPhee, R. D. E. (2015). Ancient proteins resolve the evolutionary history of Darwin's South American ungulates. *Nature*, 522(7554), 81–84.
- Welker, F., Hajdinjak, M., Talamo, S., Jaouen, K., Dannemann, M., David, F., Julien, M., Meyer, M., Kelso, J., Barnes, I., Brace, S., Kamminga, P., Fischer, R., Kessler, B. M., Stewart, J. R., Pääbo, S., Collins, M. J., & Hublin, J.-J. (2016). Palaeoproteomic evidence identifies archaic hominins associated with the Châtelperronian at the Grotte du Renne. *Proceedings of the National Academy of Sciences of the United States of America*, 113(40), 11162–11167.
- Welker, F., Smith, G. M., Hutson, J. M., Kindler, L., Garcia-Moreno, A., Villaluenga, A., Turner, E., & Gaudzinski-Windheuser, S. (2017). Middle Pleistocene protein sequences from the rhinoceros genus *Stephanorhinus* and the phylogeny of extant and extinct Middle/Late Pleistocene Rhinocerotidae. *PeerJ*, 5, e3033.
- Welker, F., Soressi, M. A., Roussel, M., Riemsdijk, I. van, Hublin, J.-J., & Collins, M. J. (2017). Variations in glutamine deamidation for a Châtelperronian bone assemblage as measured by peptide mass fingerprinting of collagen. *STAR: Science & Technology of Archaeological Research*, 3(1), 15–27.
- Welker, F., Soressi, M., Rendu, W., Hublin, J.-J., & Collins, M. (2015). Using ZooMS to identify fragmentary bone from the Late Middle/Early Upper Palaeolithic sequence of Les Cottés, France. *Journal of Archaeological Science*, 54, 279–286.
- West, D. (1996). Horse hunting, processing, and transport in the Middle Danube. *Paleolithic in the Middle Danube Region. Spisy Archeologického ústavu AV ČR v Brně*, 5, 209–245.
- White, R. (1989). Toward a contextual understanding. In E. Trinkaus (Ed.), *The Emergence of Modern Humans: Biocultural Adaptations in the Later Pleistocene* (p. 211). School of american research advanced seminar series.

- White, R., Mensan, R., Bourrillon, R., Cretin, C., Higham, T. F. G., Clark, A. E., Sisk, M. L., Tartar, E., Gardère, P., Goldberg, P., Pelegrin, J., Valladas, H., Tisnérat-Laborde, N., de Sanoit, J., Chambellan, D., & Chiotti, L. (2012). Context and dating of Aurignacian vulvar representations from Abri Castanet, France. *Proceedings of the National Academy of Sciences of the United States of America*, 109(22), 8450–8455.
- Wilson, J., van Doorn, N. L., & Collins, M. J. (2012). Assessing the extent of bone degradation using glutamine deamidation in collagen. *Analytical Chemistry*, 84(21), 9041–9048.
- Yravedra-Sainz de los Terreros, J., Gómez-Castanedo, A., Aramendi-Picado, J., Montes-Barquín, R., & Sanguino-González, J. (2016). Neanderthal and Homo sapiens subsistence strategies in the Cantabrian region of northern Spain. *Archaeological and Anthropological Sciences*, 8(4), 779–803.
- Zilberstein, G., Zilberstein, S., Maor, U., & Righetti, P. G. (2020). Surface analysis of ancient parchments via the EVA film: The Aleppo Codex. *Analytical Biochemistry*, 604, 113824.
- Zilhão, J., Angelucci, D. E., Badal-García, E., d'Errico, F., Daniel, F., Dayet, L., Douka, K., Higham, T. F. G., Martínez-Sánchez, M. J., Montes-Bernárdez, R., Murcia-Mascarós, S., Pérez-Sirvent, C., Roldán-García, C., Vanhaeren, M., Villaverde, V., Wood, R., & Zapata, J. (2010). Symbolic use of marine shells and mineral pigments by Iberian Neandertals. *Proceedings of the National Academy of Sciences of the United States of America*, 107(3), 1023–1028.