Raising up African paleoanthropologists: An innovative Master's program at Turkana University College, Kenya

Kenya is world-renowned for its extraordinary fossil and archeological collections that have disproportionately contributed to our understanding of human origins and evolution. Although Kenya boasts a small cadre of trained scientists at its universities and museums, relatively few Kenyan citizens have benefitted from advanced scientific training commensurate with the country's world-renowned scientific heritage. This inequity stems, in part, from a lack of relevant graduate programs in paleoanthropology (broadly defined, including the geological, fossil, and archeological records relevant to understanding human origins) at many eastern African institutions. Decades of research projects led by Western scientists favoring exploitative 'data-mining' approaches to field and laboratory studies over those that aimed to engage with and train local Kenyan researchers is another contributing factor. The consequences of exclusionary research practices are further amplified by the fact that most major conferences and almost all graduate programs in paleoanthropology are presently hosted in North America or Europe, where the expense of international travel. visa procurement, cultural barriers, and other issues present additional impediments to Kenyan participation.

The legacy of minimal investment in paleoanthropological research and training at Kenyan institutions is evinced by the small number of the country's citizens that have obtained doctoral degrees in paleoanthropology. This will be harmful to paleoanthropology as a whole in the long run, as Kenya's museum network is expected to greatly expand following the devolution of museums to the countylevel as mandated by the 2010 Kenyan Constitution. Thus, there is a pressing need to train local scientists and heritage managers who will be tasked with the conservation and curation of thousands of irreplaceable fossils and artifacts that, while legally owned by Kenya, are internationally significant pieces of human history and prehistory. Generating a pool of heritage stewards who are scientifically and culturally knowledgeable will help to prevent inefficient or short-sighted curatorial practices and to advocate for governmental and popular support of the country's museum network. This will be key for safeguarding Kenya's fossil and archeological records and ensuring that these treasures are preserved for all future generations.

With these factors in mind, in early 2018 a Master's of Science (M.Sc.) program in Human Evolutionary Biology (MHEB) was



FIGURE 1 Front gates of the Turkana University College, Lodwar Campus. Image credit: Sonia Harmand

established at Turkana University College, Kenya, in collaboration with the Turkana Basin Institute (TBI). Turkana University College is a constituent college of Masinde Muliro University of Science and Technology and was founded in 2017. The campus is located on the previous premises of the Mt. Kenya University Lodwar Campus (Kitale-Lodwar Highway, about 6 km from Lodwar town), but MHEB students primarily reside and take courses at the TBI Turkwel facility (https://www.turkanabasin.org/facilities/turkwel/), only a short drive from the Lodwar campus. The MHEB program presents an innovative curriculum and degree structure—course modules are taught by established experts conducting research on the geological, paleontological, and archeological records of the Turkana Basin and come from collaborating institutions around the world. Multi-week course module topics include Human Evolution, Archaeology, Ecology, Geology, Fossil Primates, and Vertebrate Paleontology. The MHEB program uses a

hybrid format to teach these subjects. Daily lectures give students an in-depth survey of core topics, introduce ongoing academic debates, and present recent developments from the primary scientific literature. Alongside lectures, students also receive hands-on field methods training in geology, archaeology, and paleontology at sites throughout the Turkana Basin, and they take a field ecology course at the Mpala Research Centre on the Laikipia Plateau. A key focus that permeates all course content is to have the students consistently sharpening their writing skills, and an intensive writing clinic is provided just before they begin drafting thesis proposals towards the end of the first year. As the MHEB program grows, the plan is to add on more 'core skill' foci. For example, the current second-year cohort of MHEB students recently received week-long workshops on statistical methods in the R programming language and in stable isotope analyses (Figures 1–3).





FIGURE 2 Turkana University College MHEB students Linet Sankau, Pauline Mbatha, and Margaret Gaiku sampling fossil mammal teeth at the National Museum of Kenya, Nairobi for stable isotope analysis. Image credit: Kevin Uno



FIGURE 3 Turkana
University College MHEB student
Emmanuel Aoron at the 'Turkana
Boy' monument during a visit to
Nariokotome in West Turkana.
Image credit: Patricia Princehouse

There are currently eight M.Sc. students enrolled in the MHEB program, all of whom have received full funding. These students have very diverse research interests, including Cenozoic paleobotany, Oligocene geology and paleoenvironments, Paleogene primates, Neogene fossil mammals, Oldowan stone tools, Holocene bioarchaeology, and Holocene plant subsistence. The MHEB program has enjoyed continuous support from TBI and has received recent grant funding from the French Ministry for Europe and Foreign Affairs. The latter supports the "Consolidating the Future through Mastering the Deep Past" project (PI: S. Harmand), which aims to develop and strengthen local expertise in paleoanthropology and cultural heritage management in Kenya. This grant is currently funding five MHEB scholarships, along with the acquisition of new educational equipment to help strengthen course content for the MHEB program.

One of the key goals of the MHEB program is to work with and train students from communities who live in the Turkana Basin, which aligns with the TBI stated core mission to promote science and technical initiatives leading to material and financial benefits for the local communities. For example, Emmanuel Aoron was raised in the Topernawi community (West Turkana) and is currently finishing his M.Sc. thesis on newly discovered fossil primates from Oligocene-aged sediments located close to his home. As the MHEB program grows, we look forward to extending opportunities to students from other eastern African countries, and to forging collaborations with an ever-expanding network of universities and scientific organizations aiming to foster the participation and representation of African scientists in paleoanthropology.

ACKNOWLEDGMENTS

The success of the MHEB program is thanks to efforts of several people. We especially would like to thank Lawrence Martin (TBI), Egara Kabaji (MMUST), Louise Leakey (TBI), Richard Leakey (TBI), Beatrice Ondango (TUC), Charles Mutai (MMUST), Glenn Starkman (CWRU), the TUC Council, and numerous guest speakers, for their guidance, logistical assistance, and continued support.

DATA AVAILABILITY STATEMENT

No data were analyzed for this study.

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