Unravelling human migrations: DISPERSALS Project sheds light on early *Homo sapiens*' journey

Pioneering research sheds light on the genesis of global human migration

In a captivating exploration of our shared human heritage, the DISPERSALS project embarks on a scientific odyssey to unravel the mysteries of early *Homo sapiens*' migration out of Africa—an epic journey that began approximately 70 000 years ago. Genetic evidence serves as the compass guiding this pioneering research, suggesting that the successful global dispersal of modern humans occurred due to the unique resilience, versatility and innovation of our species in the face of ecological and environmental changes.

Principal Investigator Nuno Bicho believes that this project will be crucial in providing archaeological, chronological and paleoenvironmental data that will be innovative and of high resolution. The project will provide a fundamental perspective on the processes related to the early migrations and dispersals of the species on the African continent and beyond, resulting in human diaspora worldwide over the last 100 000 years.

To achieve these objectives, the DISPERSALS project represents a collaborative endeavour that transcends disciplinary boundaries, bringing together a diverse and accomplished team of experts to explore the rich tapestry of early human migration. Each researcher contributes a unique skill set and perspective within this collective, fostering a multidisciplinary approach encompassing geological, archaeological, biological and anthropological dimensions.

The team's expertise spans a spectrum of scientific realms, from geoarchaeology and geophysics to biomarkers, stable isotopes and ancient DNA. Their collective efforts extend beyond traditional boundaries, seamlessly blending methodologies and insights from different fields. By integrating diverse perspectives, the project aims to construct a comprehensive storyline of human dispersal, considering the geological and environmental contexts and the cultural and biological intricacies that shaped our ancestral trajectories.

Objective: unveiling the genesis of global migration

At the forefront of this groundbreaking initiative is the main objective of DISPERSALS: to investigate the migration and dispersal dynamics of early *Homo sapiens* in Africa. The project seeks to archaeologically evaluate the genetic model proposing that southern African human populations were the genesis of the successful out-of-Africa migration 70 000 years ago.

The untold story of central Mozambique: a crucial mediator

Situated in the poorly studied Limpopo and Save river basins in central Mozambique, DISPERSALS focuses on an area that serves as a crucial mediator between two key regions of human development—southern and eastern Africa. By delving into the cultural and biological continuity/discontinuity issues and human population movements over the last 100 000 years, the project aims to shine a light on the untold story of this region.

Image 1: Machampane River in the Limpopo Valley.

Image 2: General View of the Mapa Site in the Limpopo Basin.

Innovative approach: a multi-scale exploration

DISPERSALS adopts a multi-scale approach to compare human occupation and ecology between central Mozambique, eastern and southern Africa. The project aims to reconstruct regional population patterns by studying regional diachronic cultural traits. This comprehensive investigation is further enriched by comparative quantitative population genetics, GIS computational network analyses and innovative agent-based modelling.

Simulating human dispersal: the agent-based modelling framework

The project's results will be seamlessly integrated through agent-based modelling, a cutting-edge framework that simulates the incremental creation, elimination or reorientation of network links. This innovative approach provides a quantitative simulation of the evolution of population dispersal across southern-eastern Africa, unlocking the secrets of the forces that triggered migrations and dispersals.

Image 3: Quartzite flake probably dated to the Middle Stone Age.

Crucial contributions: a scientific milestone

DISPERSALS is poised to deliver a scientific milestone by providing groundbreaking high-resolution archaeological, chronological and paleoenvironmental data. The project's findings promise to deliver a fundamental perspective on the key processes that initiated migrations and dispersals within Africa and out of Africa. Ultimately, these processes led to the human diaspora that spans the entire planet.

Conclusion: navigating the tapestry of human history

As the DISPERSALS project unfurls its sails into the uncharted waters of our ancestral past, it invites the world to explore the intricate tapestry of human history. This groundbreaking endeavour not only promises to reshape our understanding of early human migration but also invites us to embark on a journey through time, rediscovering the shared origins that connect us all.

Image 4: Archaeological excavation of the Zimuara Site in the Save Basin.

DISPERSALS

PROJECT SUMMARY

DISPERSALS will compare the human occupation and ecology between central Mozambique and eastern and southern Africa using a multi-scale approach based on the study of regional diachronic cultural traits. It will reconstruct regional population patterns, followed by comparative quantitative population genetics combined with GIS computational network analyses.

The results will then be integrated through agent-based modelling, based on the incremental creation, elimination, or reorientation of network links to simulate a quantitative framework to study the evolution of population dispersal across southern-eastern Africa. The project will be crucial in providing groundbreaking high-resolution archaeological, chronological and paleoenvironmental data.

DISPERSALS will deliver a fundamental perspective on the key processes that triggered migrations and dispersals within Africa and out of Africa, ultimately resulting in the human diaspora over the entire planet.

PROJECT LEAD

Prof. Nuno Bicho received his PhD in Anthropology from Southern Methodist University, Dallas, Texas, in 1992. He is currently a Professor of Archaeology and the Vice-Rector for Science and Culture at the University of Algarve.

He is the Director of the PhD degree in Archaeology at the University of Algarve and was the founder and, until recently, Director of ICArEHB (Interdisciplinary Center for Archaeology and Human Behavior). Together with Shannon Mcpherron, he developed and was one of the Editors-in-Chief of the recent *Journal of Paleolithic Archaeology* (Springer-Nature Group).

He specialises in Paleolithic ecodynamics, and his research has focused on prehistoric coastal hunter-gatherers of south-ern Iberia for the last three decades. More recently, he has also developed research on the Mesolithic of the Tagus Valley and on the Stone Age of Mozambique and Sudan.

CONTACT DETAILS

Professor Nuno Bicho
ICArEHB, Campus de Gambelas, University of Algarve,
8005-139 Faro, PORTUGAL

dispersals@icarehb.com
www.dispersals.icarehb.com
@Dispersals_ERC
www.instagram.com/dispersals_erc/
www.facebook.com/DispersalsERC

FUNDING

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101052761.