

CAMPAIGN **ASU** 2020



**INSTITUTE OF
HUMAN ORIGINS**

FOREWORD

A human being is the only creature on the planet that can gaze at the night sky and wonder, “Where did I come from?” Faculty in the Institute of Human Origins (IHO) at Arizona State University translate fundamental questions about how we became human into an agenda for scientific research and discovery that provides answers in the form of fossils and artifacts documenting the emergence of the human species over millions of years of geologic time. Written language emerged 5,000 years ago; our own species, *Homo sapiens*, can be traced back some 200,000 years; our genus, *Homo*, to 2.8 million years ago; and the earliest glimmers of our origins to five-million-year-old fossils from the East African Rift Valley. For more than 35 years, IHO scientists have dedicated

their work to filling the gaps in these records of our origins, carefully knitting together the pieces of evidence to create a comprehensive explanation of how we became human.

Through research in ASU labs and at field sites around the world, the IHO team has led the way in creating new knowledge about our place in the world and how we came to occupy it. Groundbreaking IHO research and discovery have brought us to the beginning of a tantalizing new chapter in the quest for our origins—one that promises to reveal how our species transcended its position as a prominent species on a millions-of-years-old African landscape to become the preeminent species on the planet today.



IHO@ASU

The Institute of Human Origins was founded in 1981 in Berkeley, California, by Donald Johanson, paleoanthropologist and discoverer of “Lucy,” the iconic 3.2-million-year-old *Australopithecus* skeleton. When IHO moved to Arizona State University, in 1997, its scientists joined the teaching faculty of a nationally top-ranked anthropology program in one of the country’s foremost research universities. In 2005, following the arrival of ASU President Michael Crow and the university’s subsequent transformation into A New American University, the anthropology department was succeeded by the School of Human Evolution and Social Change, a transdisciplinary academic unit that fuses research on the interactions among human biology, cultures, and societies from the distant past to the present day.

As a research center in ASU’s College of Liberal Arts and Sciences, **IHO exemplifies the New American University’s commitment to access, excellence, and impact.** IHO’s integrative strategy for research and discovery is central to its founding mission, bridging social, earth, and life science approaches to the most important questions concerning the course, causes, and timing of events in the human career.

IHO’s success has attracted to ASU world-class faculty who share a passion for solving the puzzles of our past across an array of perspectives and time periods spanning more than five million years of human evolutionary history.

Through their mentorship in the classroom, **IHO faculty inspire both undergraduate and graduate students** to push the search for our origins forward in new and exciting ways, preparing them to lead the next generation of scientists in research and discovery. Through innovative outreach programs that create accurate, timely information for both education and lay audiences, **IHO fosters increased awareness of human origins and its relevance to contemporary society.**

IHO’s accomplishments in this endeavor can be credited to a unique public-private partnership between ASU, the IHO Board of Directors (and now the IHO Research Council), and our community of dedicated supporters. Building on this success, and with the encouragement of ASU President Crow, **we envision a future in which IHO is the global leader in the scientific understanding of human origins.**

IHO'S STRATEGIC FOCUS: THE EVOLUTIONARY FOUNDATIONS OF HUMAN UNIQUENESS

Our species, *Homo sapiens*, is an oddity among the life forms on this planet. Our societies are much larger and more complex than that of any other species, and our tools and artifacts are vastly more sophisticated. We humans view the world, and communicate with one other, through a symbolic lens made possible by extraordinarily complex cognition. It has been at least six million years since our lineage split from the chimpanzee's, yet only in the last hundred thousand years have we spread across the planet to occupy virtually every terrestrial habitat, the culmination of an extraordinary series of evolutionary events that have no parallel elsewhere in the history of Earth's biota.

In the field and in the lab, **IHO scientists are closing in on answers to critical questions about our past**, such as

- When and why did we evolve our unique two-legged terrestrial locomotion?
- What events led to our brains becoming many times larger than that of our primate cousins?
- How did the earliest stone tools set the stage for our mastery of complex technology?
- How did our advanced cognition lead to the emergence of unprecedentedly large-scale cooperation?
- How does the deep past inform us about our relationship to a changeable planet?

Understanding how these transformations in body and mind occurred is one of the most compelling quests in all of science and a puzzle whose solution lies at the heart of what it means to be human.

At ASU, IHO recognizes that to address the puzzle of our origins comprehensively requires integrating deep-time perspectives on the biology, behavior, and culture of our extinct

ancestors with insights from the behavior and genetics of present-day populations of humans and our primate cousins.

Recent high-profile successes include:

- Discovery of the earliest known fossil of the genus *Homo* and ancient stone tools at Ledi-Geraru, Ethiopia, 2.8–2.6 million-years old (led by President's Professor Kaye Reed)
- Extraction from east African lake-bed drill cores of an unprecedentedly complete record of ancient environmental change, the backdrop to six million years of human evolution (led by Assistant Professor Chris Campisano)
- Discovery of evidence for the origins of modern human cultural behavior from the Pinnacle Point archaeological site, South Africa, 160–60 thousand-years old (led by Foundation Professor Curtis Marean)
- Experimental research on problem-solving showing how cognitive leaps in human evolution may have sparked innovation and cooperation in small social groups (led by Origins Professor Robert Boyd and Templeton postdoctoral scholar Maxime Derex)
- DNA studies of wild-living chimpanzees documenting the genetic underpinnings of complex social networks (led by Assistant Professors Ian Gilby, Kevin Langergraber, and National Academy of Sciences member Regents' Professor Anne Stone)

Each of these results represents one part of one chapter in our evolutionary story. Together, they form a long-term agenda for IHO research and discovery that creates holistic scientific explanations of humankind's place in nature. The research agenda entails long strategic arcs of planning, exploration, sustained field work, analytical studies, interpretation of results, and synthesis—all of which require significant long-term investment.



IHO IN CAMPAIGN ASU 2020

Through Campaign ASU 2020, we will solidify the foundation of IHO's research agenda on the evolution of human uniqueness and expand the scope of IHO science into new realms of inquiry with investments in fresh initiatives and star faculty. It will enable greater participation of ASU graduate and undergraduate students in cutting-edge human origins research, ensuring early-career success and impact. By expanding and revitalizing IHO's "digital ecosystem," Campaign ASU 2020 will translate new scientific knowledge into innovative inquiry-based learning tools for K-12 classrooms and create new pathways to enrich the public understanding of human origins science. And, it will secure the future of the IHO enterprise with investments in new faculty and in critical research infrastructure, both at home on the ASU campus and in far-flung field sites around the world.

▣ FUEL DISCOVERY, CREATIVITY, AND INNOVATION (\$18,000,000)

Pump-priming exploration in strategically important field locales and time periods will place IHO scientists at a strong advantage in the competition for long-term external research funding. For example, on the heels of an IHO team's discovery of the oldest *Homo* fossil in Ethiopia, we will continue work at IHO's "gold mine" sites of Hadar and Ledi-Geraru and expand the hunt for new fossil-bearing sites in the poorly understood two- to three-million-year time period, which is critical to understanding the fate of *Australopithecus*, the origin of *Homo*, and advent of stone-tool making.

Enlarging IHO's geographical footprint will place our field scientists in strategically critical areas of the world. To that end, we will launch a field project in the Altai mountains of central Asia (Mongolia) to hunt for tools and fossils of Pleistocene populations, known so far only from DNA traces in fragments of fossil bone (i.e., the Denisovans), representing initial waves of human migration from Africa across the Old World.

Constructing an IHO network of international research collaborations, encompassing field and lab projects in Africa, Eurasia, and Europe will maximize efficiency and impact of new discoveries. Building on the success of IHO field work at Pinnacle Point, South Africa, we will launch an innovative international network of thematically linked field projects, with coordinated goals, expertise, and resources, on the origins of early modern humans and their migration across the Old World in the late Pleistocene.

A new initiative on the origins of human cognitive complexity will unite the fields of neurobiology, paleoanthropology, and studies of contemporary human populations and nonhuman primate behavior to identify the evolutionary links between cognition and technology.

Integrating perspectives from modern human populations with empirical records from the past will solidify IHO's transdisciplinary approach to human origins science. For example, expanding research on the coastal adaptations of contemporary human populations in the Philippines will permit testing hypotheses, based on finds from IHO's project at Pinnacle Point, South Africa, that link the origin of modern human behavior and the early migrations across southern Asia to coastal resource exploitation.

As humankind's closest living relative, the chimpanzee faces social and ecological pressures thought to be similar to those confronted by our remote ancestors. *Field studies of wild chimpanzees are therefore essential for tracing the origins of our specialized social behavior*, including our capacity for large-scale cooperation. A new partnership with the Jane Goodall Institute will conduct long-term research on the iconic chimpanzees of Gombe National Park, Tanzania. Drawing on Gombe's unique 50-year record of behavioral observations plus new genetic and hormonal data, this research will address the evolutionary basis of friendship, group territory defense, and temperament, all of which have far-reaching implications for understanding the roots of cooperation in the human lineage.

IHO's mission of discovery begins in the field. For three decades, our scientists have worked in some of the most inhospitable locales to unearth our origins, and this has taken its toll on IHO's field infrastructure. For example, projects in Ethiopia and South Africa depend on vehicles, camping gear, and data-collection instruments which, approaching one to two decades in age, are rapidly becoming obsolete. *Campaign ASU 2020 will address these critical infrastructure needs*, many of which fall outside of allowable research grant-funded budgets.





□ ELEVATE THE ACADEMIC ENTERPRISE (\$6,000,000)

Critical exploration and research funds for new university-funded faculty will unlock the potential of IHO research initiatives, jump-start stellar careers in human origins science, and promote IHO's preeminence at the leading edge of discovery in human origins science. Two new IHO-affiliated faculty positions are needed: an archaeologist specializing in the cognitive basis of technological evolution, and a paleoanthropologist focused on Neanderthal and early modern human life-ways.

Postdoctoral positions provide the best advanced training for newly minted researchers and help cement the IHO brand of transdisciplinary human origins research in the professional community. We plan to fund five IHO Postdoctoral Scholars through the campaign.

Unrestricted support for operations. IHO thrives, in part, due to a steady flow of external revenue for operations, approximately \$400,000 per year. This supports staff positions, summer salary for faculty, exploratory research, and work-study positions. Increasing unrestricted support will allow IHO to expand its programmatic efforts.

IHO's need for integrated office, lab, and teaching space on ASU's Tempe campus has been built into university capital projects planning. Equipping the lab facilities with the latest computing, visualization, and analytical instrumentation acknowledges that *interpretation* of the evidence is an equal partner to its *discovery*.

- Laboratory naming opportunities in future IHO home in ISTB-7
- Critical equipment needs, including 3-D scanning equipment and computers for high-resolution image-based research on fossils and artifacts

□ ENSURE STUDENT ACCESS AND EXCELLENCE (\$3,000,000)

There is no more direct way to increase understanding of human origins than to introduce young scholars to the inner workings of the research enterprise alongside the world-renowned IHO scientists. Not only will we inspire the next generation of top human origins scientists, but we will also help create a more scientifically literate public.

Research opportunities for undergraduate students, including transformational field experiences alongside IHO faculty at their work sites around the globe, provide unique exposures to front-line research and a firm grounding in global awareness.

Five-year recruitment scholarships (stipend+tuition+health insurance) for the top-ranked graduate students seeking to apprentice with IHO faculty at ASU. Graduate students are the life-blood of a thriving research enterprise; IHO must maintain a leading position in the annual competition for the best students.

Graduate student "pilot research" grants to enhance competitiveness in external research funding. A critical indicator of a successful Ph.D. program is time-to-degree. Graduate students are trained in grant-proposal writing in our program, but their competitiveness in funding—and their efficiency in degree completion—will be substantially improved if initial IHO funding for exploratory research can be showcased in external funding proposals.

Student funding designated to increase representation of women and under-represented groups in human origins science at ASU. Inclusiveness and broad representation in science is a priority at ASU, and IHO will meet this challenge by devoting funding to recruitment of women and minority students to our graduate program.

□ ENRICH OUR COMMUNITIES (\$500,000)

Spanning multiple web portals, from an IHO mobile app to the "Webby" award-winning BecomingHuman.org, and the new AskAnAnthropologist.asu.edu learning resource, IHO's digital ecosystem is designed to reach the broadest audience possible—repaying childhood wonder about our origins with the knowledge outcomes of IHO research and discovery.

IHO will launch a BecomingHuman YouTube channel, where professionally produced short videos will introduce the evidence for human evolution and illustrate how scientists use that evidence to draw conclusions about our past.

IHO is designing innovative, web-based games for our public websites, in which students will learn about human origins through strategic decision-making, playing the role, for example, of an early human searching for resources on ancient landscape or of a paleoanthropologist searching for fossils and artifacts in the East African Rift Valley.



CONCLUSION

For more than 35 years, IHO scientists have contributed critical discoveries and fresh insights to the broad awareness of our origins. Now, we stand poised to push even further at the leading edge of discovery with groundbreaking new science, unparalleled opportunities for our students, and innovative outreach to the public. An investment in IHO helps secure the future of the scientific meaning of "becoming human," and propels IHO to a position of global leadership in the creation of new knowledge about our origins.

With your generous support, Arizona State University has reinvented the public research university. We are both more inclusive and more accomplished than ever, with ASU students and faculty earning unprecedented levels of recognition for their achievements. Our graduates leave here as master learners who are capable of rising to meet any new and unfamiliar challenge. ASU students, faculty, and graduates also are firmly rooted in their communities and committed to advancing the common good. Together, we have created a model for other universities to follow. Your support during Campaign ASU 2020 will help us break more new ground by raising \$1.5 billion to propel our vision for higher education into the next decade and beyond.

ARIZONA STATE UNIVERSITY is a comprehensive public research university, measured not by whom we exclude, but rather by whom we include and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves.



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