

# NIJ and University of South Florida

## Creating an International Databank of Skeletal Biomarkers for Human Identification (DHI)

Moving Knowledge from Research to Impact



*“Forensic anthropology today is largely about applying methods and theory from studies in human variation to aid in the identification of human remains. The key is to find an approach which takes into account biological, cultural, and legal diversity so that families of the missing and the broader community find resolution and peace.”*

Erin Kimmerle, PhD  
 Director, Florida Institute of Forensic Anthropology and Applied Sciences (IFAAS)  
 University of South Florida

### Synopsis of Problem and Solution

According to the Federal Bureau of Investigation’s (FBI’s) National Crime Information Center (NCIC), Missing Person and Unidentified Person Files, there are approximately 13,500 unidentified individual cases in the United States, and about 1,000 new unidentified individual cases remain open annually. The challenges associated with identifying these individuals is complicated by various reporting systems and protocols, a lack of interagency communication, cross-jurisdictional boundaries, and differential access to resources.

A clear framework for the varied contexts, clarification on the degree to which populations vary, and the potential causes for observed variation are needed to improve human identification. With the support of National Institute of Justice (NIJ) funding, Erin Kimmerle, PhD, and her team at the University of South Florida developed a large dataset—the International Databank of Skeletal Biomarkers for Human Identification (DHI)—to help answer questions about skeletal variation in human identification. This research effort was designed to be a multiyear study involving data collection from autopsies at the Department of Pathology and Forensic Medicine, Lagos State University College of Medicine (LASUCOM), Lagos, Nigeria, and numerous museum skeletal collections with African and Diaspora populations.

### Benefits

- Provides osteometric, morphological, and isotopic parameters for human identification
- Enables insight into human skeletal variation with implications for human identification
- Results in the development of internationally relevant data protocols and resources, and quantified estimation parameters for morphological and metric-based data

## The Future

- Additional data are being integrated into a relational format to be shared with the forensic community.
- One of the key areas for further research is chemical and elemental testing and development of more reference samples throughout Africa. The focus of this work for isotope data was primarily Nigeria. Additional samples from Northern Africa and the Middle East would enable the georeferencing of birth locations and migration among individuals to be more accurate and narrowly focused.

## NIJ-Funded Research

With NIJ grant support, Dr. Kimmerle and her team collected osteometric, morphological, and elemental and isotope data on skeletal and dental traits for contemporary African populations in Nigeria and other contemporary American populations and Diaspora. The grant allowed Dr. Kimmerle to assess the degree of population variation among diverse populations and determine the applicability of identification methods to be used across populations. She developed internationally relevant data protocols and a framework for research in human identification (RHI). The data resulting from the research are contained in an Excel file called DHI. This file is open for use by the public. The protocols and estimation parameters can be found at <http://www.forensics.usf.edu/>.

## Bringing Research to Practice

As a result of this research, numerous presentations and publications have been produced on human identification, methods for estimating the biological profile, population-specific calibrations of specific methods, and chemical and elemental data for identification.

- The protocols provide preliminary, population-specific parameters for age at death, ancestry, and other biomarker estimation.
- The protocols are used as standard practice for laboratory work (including methods for osteological and chemical analysis, and forensic imaging and art by IFAAS at the University of South Florida in active casework for law enforcement throughout Florida).
- The forensic science and medical students at LASUCOM are using the protocols and methods for forensic identification.
- The 3D digital protocol has the benefit of educating students and allowing access to reference materials such as age markers.

## More Information

To learn more about this research, please contact:

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