

# 3D DATA ACQUISITION FOR BIOARCHAEOLOGY, FORENSIC ANTHROPOLOGY, AND ARCHAEOLOGY

*3D Data Acquisition for Bioarchaeology, Forensic Anthropology, and Archaeology* serves as a guide for students and researchers that are interested in the use of geometric morphometric analyses in forensic and bioarcheological contexts. Digitizing and imaging methods that allow for the collection of three-dimensional (3D) data have vastly expanded and improved analytical methods for exploring shape and morphological diversification. The 3D approach is becoming a significant tool kit in biological/forensic anthropology, and archaeology as the application of geometric morphometrics to the study of the human skeleton allows for in-depth analysis of morphological variation in several dimensions simultaneously. Simply put, these approaches allow for examination of skeletal dimensions outside of the vertical and horizontal planes that are used in traditional studies of skeletal metrics.

The chapters provided in this book offer clear definitions and explanations of different types of 3D data, to include 3D digitizer, landmarks and semilandmarks, scan data derived from 3D scanners, CT, and digital mesh models created from scan data. Craniofacial data acquisition and data analysis is the main focus of this text, but a brief tutorial on data acquisition and analysis of lithic artifacts is also provided. We offer best practices of data acquisition methods for recording landmark and semilandmark data on human crania, to include fragile archaeological human remains. The reader's understanding of geometric morphometrics will be enriched by descriptions and tutorials on the technology used for virtual model processing protocols, alignment methods; data acquisition techniques, basic technological protocols, and variations in research design within different subfields of biological anthropology and archaeology.

## Key Features

- Descriptions of commonly used types of 3D data and associated technology
- Introduction and tutorials on the protocols of image data collection and processing
- Best practices for collecting 3D data on fragile human remains
- Case study example of working with 3D mesh and coordinate data in R
- Application of 3DGM to stone artifacts

## About the Editors

Noriko Seguchi, PhD, completed her PhD in biological anthropology at the University of Michigan, Ann Arbor. She has been working on modern human diversity and population history and structure using craniofacial morphometrics data and postcranial data. Currently, she has been engaged in research on the global health history of Asia, the issue of repatriation of Ainu human remains, and the issue of "race" and gender in the history of biological anthropology in Japan. She is currently an associate professor of biological anthropology at the Faculty of Social and Cultural Studies at Kyushu University, Japan; a faculty affiliate of Department of Anthropology at the University of Montana, Missoula, USA; and appointed as an Honorary Research Fellow and Academic committee at the International Research Center for Bioarchaeology, the School of Archaeology, Jilin University, Jilin, Changchun, China.

Beatrix Dudzik, PhD, completed her doctoral degree in biological anthropology at the University of Tennessee, Knoxville. Her research focuses on variation of the human skeleton and the examination of geometric morphometric and traditional craniometric data in Asian and Hispanic populations. She has published studies on craniometric variation in peer-reviewed journals, both in biological and forensic anthropological contexts. Her research has been funded by the National Science Foundation as well as the National Institute of Justice. She currently works as an associate professor of anatomy at Lincoln Memorial University.



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