



## Physical Anthropology Section - 2014

### H92 Morphoscopic Trait Frequencies of Southeast Asians and Pacific Islanders

Melody D. Ratliff, BA\*, 3005 Tina Avenue, 3B, Missoula, MT 59808

After attending this presentation, attendees will understand the frequency distribution of morphoscopic traits among populations of the Pacific Islands and regions of Southeast Asia, the biological relationships between the populations of these regions with regard to those traits, and where these populations fall in a forensic ancestry classification.

This presentation will impact the forensic science community by providing data on the distribution of morphoscopic traits among populations of various islands of the Pacific and oceanic regions of Southeast Asia and illustrate the variability between each region. This presentation will also demonstrate how individuals from these regions are categorized in comparison to individuals from mainland Asia as well as individuals of European, African, and Native American ancestry for a forensic application.

When assessing ancestry in a forensic context, individuals are generally classified into one of four categories: belonging to European, African, Asian, or Native American ancestry. This leaves out many populations that are generally more difficult to assess due to ancestral admixture and/or limited research about the population in question. With only these four ancestry assessments, individuals from Southeast Asia and the Pacific Islands are usually phenotypically classified as Asian. While the oceanic regions of Southeast Asia and the Pacific Islands will undoubtedly have morphoscopic trait frequencies similar to those of mainland Asia because of their shared ancestral lineages, there is still a great deal of variability in this region with genetic drift being an important factor. Previous studies of this region using craniometric data have shown a separation between Southeast Asia and North/East Asia, while also noting a close connection between island Southeast Asia and mainland Southeast Asia.<sup>1,2</sup> Inter-regional clinal patterns of variation in these regions have also been noted by previous researchers using both craniometric and non-metric data.<sup>1,3</sup> This provides evidence for a possible distinction between morphometric trait frequencies of populations of the oceanic region and those of mainland Asia.

To address the variability within these regions and where they fall in a forensic classification, data were taken using Osteoware™ on sixteen morphoscopic traits: ANS; INA; IOB; MT; NAS; NAW; NBC; NBS; NO; NFS; OS; PBD; PZT; SNS; ZYC; and, TPS.<sup>4</sup> Skeletal specimens include (n=150) from the physical anthropology skeletal collection at the Smithsonian National Museum of Natural History and (n=33) from the University of Pennsylvania Museum of Archaeology and Anthropology's physical anthropology skeletal collection, for a total sample of (n=183). Populations collected include individuals from Indonesia, Malaysia, New Zealand, French Polynesia, Papua New Guinea, Fiji, and the Philippines.

A separation between groups can be clearly seen when morphoscopic trait frequencies of the Asiatic populations are compared with trait frequencies of European and African groups. As the different Asiatic groupings are narrowed down, a separation is still present but with more ambiguity. Canonical variance and principal component analyses illustrate that the island Southeast Asian and Pacific Island populations can be slightly differentiated from the mainland Asian population, though not with great clarity. When the island Southeast Asian and Pacific Islander populations are incorporated into the Asian groupings for frequency distributions, a much higher within-group variance is found, indicating that groups from these two regions may not work well within the larger Asian grouping and could potentially be separated from the larger Asiatic grouping. In conclusion, most individuals from Southeast Asia and the Pacific Islands tend to fall near the Asian categorization, though there is a slight separation from the mainland Asiatic population suggesting differentiation between mainland Asians and Southeast Asians/Pacific Islanders may perhaps be possible for a forensic ancestry assessment.

#### References:

1. Pietrusewsky, M. Craniometric variation in Southeast Asia and neighboring regions: A multivariate analysis of cranial measurements. *Human Evol* 2008;23(1-2):49-86.
2. Pietrusewsky, M. The modern inhabitants of Island Southeast Asia: a craniometric perspective. In: E. Indriati, editor. *Proceedings of the International Seminar on Southeast Asian Paleoanthropology: Recent Advances on Southeast Asian Paleoanthropology and Archaeology* 2008;185-201.
3. Hanihara T, Ishida H. Frequency variation of discrete cranial traits in major human populations. III. Hyperstotic variations. *J. Anat.* 2001;199:251-72.
4. Osteoware Computer Program. Smithsonian Institute, Washington, D.C. 20013-7012, 2011.

#### Ancestry, Morphoscopic Traits, Pacific Islands