

Centre for Archaeological Science

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Professional Profile

- Qualifications: PhD, Utrecht University The Netherlands
- Awards: ARC Future Fellowship (2011-2014)

Research Interests

- Taphonomy / Sedimentology / Zooarchaeology of human occupation sites
- (Paleo) Zoogeography of Southeast Asia
- Evolution of Proboscideans (elephants and their kin)
- Evolution of island mammals
- Quaternary environmental change and catastrophic events and their impact on terrestrial fauna evolution, human evolution and human subsistence

Environmental reconstruction of human occupation sites

With a professional training in sedimentology and vertebrate palaeontology, I have combined those disciplines to investigate the formation and preservation of fossil vertebrate occurrences, that is, the taphonomy of fossil occurrences. Particularly at archaeological sites, where humans may have represented one of the many agents that contributed to the concentration of faunal remains, taphonomic studies are essential in assessing the environmental background for early humans and their subsistence. In recent years I have coordinated the analysis of the faunal remains associated with *Homo floresiensis*, the 95,000 to 17,000 year-old human species discovered in 2003 in Liang Bua Cave on the Indonesian island of Flores.

Representative Publications

- Brumm, A., Jensen, G.M., van den Bergh, G.D., Morwood, M.J., Kurniawan, I., Aziz, F. & Storey, M., (2010). Hominins on Flores, Indonesia, by one million years ago. *Nature* 464, 748-752.
- Bergh, G.D. van den, Kurniawan, I., Morwood, M.J., Lentfer, C.J., Suyono, Setiawan, R. & Aziz, F. (2009). Environmental reconstruction of the Middle Pleistocene archaeological/palaeontological site Mata Menge, Flores, Indonesia. In: F. Aziz, M.J. Morwood & G.D. van den Bergh (Eds.), *Pleistocene Geology, Palaeontology and Archaeology of the Soa Basin, Central Flores, Indonesia*. Bandung, Geological Survey Institute Special Publication 36, 59-94.
- Bergh, G.D. van den, Meijer, H.J.M., Rokus, A.D., Morwood, M.J., Szabo, K., van den Hoek Ostende, L.W., Sutikna, T., Saptomo, E.W., Piper, P.J. & Dobney, K.M. (2009). The Liang Bua faunal remains: a 95 k.yr .sequence from Flores, East Indonesia. *Journal of Human Evolution* 57, 527-537.

- Brumm, A., Aziz, F., van den Bergh, G.D., Morwood, M.J., Moore, M.W., Kurniawan, I., Hobbs, D.R. & Fullagar, R. (2006). Early stone technology on Flores and its implications for *Homo floresiensis*. *Nature* 441, 624-628.



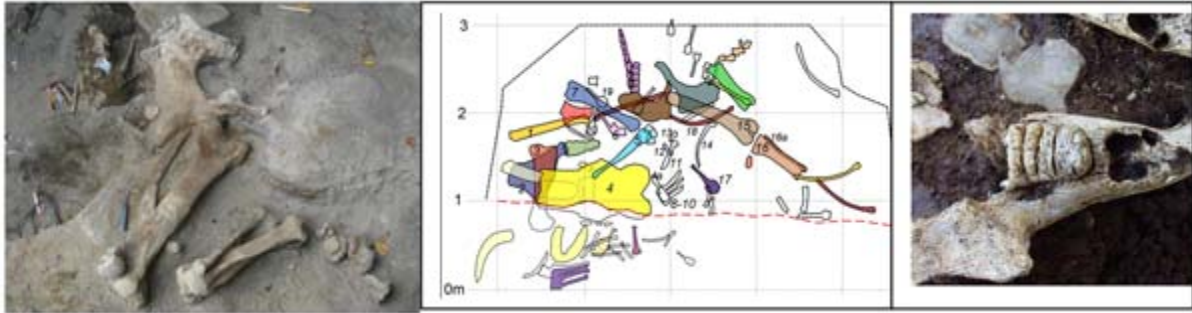
Left: At the open site Mata Menge on Flores tuffaceous sands, deposited 800,000 years old, in a lake shore environment, have yielded a large assemblage of palaeolithic stone artefacts associated with *Stegodon* and other vertebrate remains. Middle: Step trenches were dug to expose details of the stratigraphy that will enable reconstruction of the local environmental history near Mata Menge. Right: Some of the *Stegodon* bones from Liang Bua with cutmarks providing evidence for butchering.

Islands and elephants

Over the years, my research has mainly taken place in Indonesia, where I have participated in numerous multidisciplinary projects with geological, archaeological and/or biological components. My palaeontological work has primarily focussed on the [evolution of elephants and island vertebrates](#). The evolution of vertebrates on comparatively simple, isolated island ecosystems may be considered as natural experiments, and help provide new insights in to evolutionary processes. The mid-Quaternary appearance of humans on the Indonesian island of Flores forms a unique case, where many of my interests converge. The geological record of Flores offers the potential to unravel the interactions between island fauna (including dwarfed elephants), humans, climate change and natural catastrophes.

Representative Publications

- Bergh, G.D. van den, Sondaar, P.Y., de Vos, J. & Aziz, F. (1996). The Proboscideans of the Southeast Asian Islands. In: *The Proboscidea: Trends in Evolution and Paleoecology* (eds. J. Shoshani and P. Tassy) Oxford University Press, 240-248.
- Mol, D., de Vos, J., van den Bergh, G.D. & Sondaar, P.Y. (1996). The taxonomy and ancestry of fossil elephants of Crete; faunal turnover and a comparison with proboscidean faunas of Indonesian Islands. In: D. Reese (ed.), *Pleistocene and Holocene Fauna of Crete and Its First Settlers*. *Monographs in World Archaeology* 28, 81-98.
- Morwood, M.J., Soejono, R.P., Roberts, R.G., Sutikna, T., Turney, C.S.M., Westaway, K.E., Rink, W.J., Zhao, J-x., Bird, M.I., van den Bergh, G.D., Rokus, A. D., Hobbs, D.R., Fifield, L.K. & Moore, M.W. (2004). Archaeology and age of a new hominin from Flores in eastern Indonesia. *Nature* 431, 1087-1091.
- Bergh, G.D. van den, Rokhus, A.D., Morwood, M.J., Sutikna, T., Jatmiko & Saptomo, E. W. (2008). The youngest *Stegodon* remains in Southeast Asia from the Late Pleistocene archaeological site Liang Bua, Flores, Indonesia. *Quaternary International* 182, 16-48.



Right and centre: Fossil remains of an elephant excavated near Sunggu village in east Central Java. The skeleton, including the skull, is of a species ancestral to the modern *Elephas maximus*, the Indian Elephant (photo: Erick Setiabudi). Right: A mandible of a juvenile pygmy *Stegodon* from Liang Bua Cave associated with stone artefacts.

Zoogeography of Southeast Asia

Tropical Island South-East Asia has one of the richest biodiversities in the world, which is due to the highly active tectonic history that led to a strong fragmentation of the region. However, complex patterns of species diversity remain poorly understood because the fossil record is rather fragmentary and incomplete. An exception is the island of Java, where a long history of paleontological research has led to a relatively well-known Quaternary faunal sequence. During glacial periods with low sea-level, Java was connected with mainland Asia, allowing overland dispersal of land vertebrates, including *Homo erectus* around 1.6 million years ago. On other more remote islands like Sulawesi, the fossil fauna appears to bear no relation to the modern fauna. Part of my work in Indonesia has been dedicated to reconstruct bits and pieces of this complex zoogeographic puzzle and to learn more about the environments that set the stage for human evolution in, and migration through, this region.

Representative Publications

- Bergh, G.D. van den (1999). The Late Neogene elephantoid-bearing faunas of Indonesia and their palaeozoogeographic implications; a study of the terrestrial faunal succession of Sulawesi, Flores and Java, including evidence for early hominid dispersal east of Wallace's Line. *Scripta Geologica* 117, 1-419.
- Bergh, G.D. van den, de Vos, J. & Sondaar, P.Y. (2001). The Late Quaternary palaeogeography of mammal evolution in the Indonesian Archipelago. *Palaeogeography, Palaeoclimatology, Palaeoecology* 171, 385-408.
- Westaway, K.E., Morwood, M.J., Roberts, R.G., Rokus, A.D., Zhao, J.-x., Storm, P., Aziz, F., van den Bergh, G.D., Hadi, P., Jatmiko, & de Vos, J. 2007. Age and biostratigraphic significance of the Punung Rainforest Fauna, East Java, Indonesia, and implications for *Pongo* and *Homo*. *Journal of Human Evolution* 53, 709-717.
- Hocknull, S.A., Piper, P.J., van den Bergh, G.D., Rokus A.D., Morwood, M., & Kuriniawan, I. (2009). Dragon's paradise lost: palaeobiogeography, evolution and extinction of the largest-ever terrestrial lizards (Varanidae). *PLoS ONE* 4(9), 1-15.

[Searchable Publication List: from 2000](#)

Research Projects

I am currently involved in three major ARC funded projects. As a palaeontologist and sedimentologist, my research focuses on the environmental reconstruction of early hominin sites in Asia, in collaboration with a multidisciplinary team of leading Australian and international scientists.

Current major projects

- [“In search of the first Asian hominins](#): excavations at Mata Menge, Flores, Indonesia” (ARC Discovery Project, 2010–2015; Chief Investigator: Mike Morwood).
- [“Unlocking archives of faunal dispersal](#) in rock deposits: the key to reconstructing palaeoenvironmental change and human dispersal in Southeast Asia” (ARC Discovery Project, 2010-2012; Chief Investigator: Kira Westaway).
- [Size matters](#): elephantoid dispersal, evolution, paleoecology and extinction in Asia (ARC Future Fellowship, 2010-2014)

Potential Honours and PhD subjects

- Indonesia: Reconstruction of sedimentary environments of early human occupation sites in Sulawesi, Flores and Java;
- Taphonomy of Pleistocene vertebrate assemblages from Flores and Java
- Southeast Asia: Palaeoecology of fossil Proboscideans by analysing stable isotope records from tooth enamel;
- spatial and temporal analysis of fossil Proboscidean occurrences;
- zoogeography, evolution and extinction of large fossil mammals