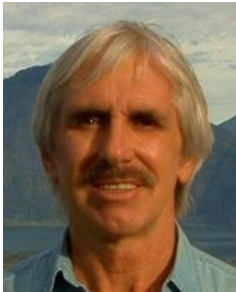


**J. STEPHEN LANSING**  
**University of Arizona**



J. Stephen Lansing is an external professor at the Santa Fe Institute, birthplace of complexity studies; a professor of anthropology at the University of Arizona, with a joint appointment in ecology and evolutionary biology, and a senior fellow at the Stockholm Resilience Centre. Recent books include *Perfect Order: Recognizing Complexity in Bali* (2006) and *Priests & Programmers: Technologies of Power in the Engineered Landscape of Bali* (2007). Documentary films include *The Goddess and the Computer* (1988), a segment of *The Sacred Balance* (2003), *Perfect Order* (2006) and *Voyagers on the Ring of*

*Fire* (2011).

**Abstract**

**Did clouds of butterflies propel the last great human migration?**

The Austronesian expansion into Island Southeast Asia and the Pacific was the last and most far-reaching prehistoric human migration. Austronesian languages replaced indigenous languages over nearly half the globe, yet the absolute number of Austronesian colonists was small. Recently, geneticists have identified large geographic disparities in the relative proportions of Asian ancestry across different genetic systems in Austronesian-speaking societies of Island Southeast Asia and the Pacific. Surprisingly, a substantial genetic discontinuity occurs in the middle of a continuous chain of islands that form the southern arc of the Indonesian archipelago, near the geographic center of the Austronesian world. In the absence of geographic barriers to migration, this genetic boundary and swathe of Austronesian language replacement must have emerged from social behavior. Edward Lorenz' model of a "butterfly effect" shows how the iteration of initially tiny variation in initial parameterization can rapidly generate chaotic dynamics. A question of interest is whether, over the course of many generations, clouds of butterflies could create the observed transition in the genetic makeup of the Austronesian expansion.