



NIMBioS

National Institute for Mathematical
and Biological Synthesis



NIMBioS Interdisciplinary Seminar

3:30 p.m.*, Tuesday, April 16, 2013

Dr. Tom Currie

**Human Evolutionary Ecology Research Group
University College London**

“War and space: Simulating the evolution of old world complex societies”

How did human societies evolve from small groups, integrated by face-to-face cooperation, to huge anonymous societies of today, typically organized as states? Why is there so much variation in the ability of different human populations to construct viable states? Existing theories are usually formulated as verbal models and, as a result, do not yield sharply defined, quantitative predictions that could be unambiguously tested with data. In this talk, I will discuss work I have been doing in conjunction with Sergey Gavrilets (NIMBioS, University of Tennessee) and Peter Turchin (University of Connecticut) to develop cultural evolutionary models that predict where and when the largest-scale complex societies arose in human history. Our initial model focuses on the role of costly ultrasocial institutions that enable groups to function without splitting up, and argues that these evolved as a result of intense competition between societies, primarily warfare. Warfare intensity, in turn, depended on the spread of historically-attested military technologies (e.g., chariots and cavalry) and on geographic factors (e.g., rugged landscape). The model was simulated within a realistic landscape of the Afroeurasian landmass, and its predictions were tested against a large dataset documenting the spatio-temporal distribution of historical large-scale societies in Afroeurasia between 1500 BCE and 1500 CE. The model-predicted pattern of spread of large-scale societies was very similar to the observed one. I will discuss the implications of this work and future directions we are exploring as part of my research visit to NIMBioS.

Hallam Auditorium, Room 206, Claxton Education Building, 1122 Volunteer Blvd.

**Join us for refreshments at 3 p.m. in the 1st floor visitor breakroom.*

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The National Institute for Mathematical and Biological Synthesis (NIMBioS) brings together researchers from around the world to collaborate across disciplinary boundaries to investigate solutions to basic and applied problems in the life sciences. NIMBioS is sponsored by the National Science Foundation, the U.S. Department of Homeland Security, and the U.S. Department of Agriculture with additional support from The University of Tennessee, Knoxville.

