

Place:
**Seminar Room 1, 6th floor
Nakano Campus, Meiji University**

Date:
16^{th.} -- 19^{th.} December

2013

Cultural evolution occurs when an innovation produced by individual learning (e.g. trial-and-error) is propagated through the population by social learning (e.g. imitation). A learning strategy is defined as the way in which individual learning and social learning are combined, either simultaneously or sequentially, and the relative dependence on each. Pathways and biases of social learning are also integral components of a learning strategy. The direction and rate of cultural evolution are dependent on the learning strategy that supports it, and hence the two are intimately linked. In this lecture series, we will describe various genetically-determined learning strategies that may support human culture, and—on the assumption that learning is a biological adaptation to environmental variability— identify the theoretical conditions for their evolution. Furthermore, we will explain how differences in learning strategies, in conjunction with demographic factors, can affect the rate at which culture evolves and the amount of cultural variability that can be maintained.

In addition to the above, there will be four lectures on Palaeolithic cultures by prehistoric archaeologists, providing an empirical background against which the relevance of the modeling efforts described in this lecture series can be evaluated.

Mathematical Science of Stone Age Cultures

石器時代文化の現象数学



All lectures to be given in English. 講義は全て英語で行います。

12/16 (Mon) Cultural Evolution and the Archaeological Record

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|-------------|----------------|---|
| 09:45-11:15 | KENICHI AOKI | "QUANTIFYING CULTURAL EVOLUTION" |
| 11:30-13:00 | KENICHI AOKI | "DEFINING A LONG-TERM CULTURAL EVOLUTIONARY RATE" |
| 14:15-15:45 | SEIJI KADOWAKI | "LITHIC TRADITIONS IN AFRICA AND THE LEVANT" |
| 16:00-17:30 | KATSUHIRO SANO | "LITHIC TRADITIONS IN EUROPE" |

12/17 (Tue) Learning Strategies as Determinants of Cultural Evolution and Dating of Past Events

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| 09:45-11:15 | KENICHI AOKI | "MODES OF TRANSMISSION, INNOVATION RATE, AND DEMOGRAPHY" |
| 11:30-13:00 | KENICHI AOKI | "EXERCISES IN BIRTH-DEATH CHAINS" |
| 14:15-15:45 | KENICHI AOKI | "SOCIAL AND INDIVIDUAL LEARNING 1" |
| 16:00-17:30 | TAKAYUKI OMORI | "BAYESIAN DATING METHODS" |

12/18 (Wed) Learning Strategy Evolution and Eco-cultural Niche Modeling

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|-------------|-----------------|---|
| 09:45-11:15 | KENICHI AOKI | "SOCIAL AND INDIVIDUAL LEARNING 2" |
| 11:30-13:00 | KENICHI AOKI | "EXERCISES IN LOCAL STABILITY ANALYSIS OF PERIODIC SOLUTIONS" |
| 14:15-15:45 | YUICHIRO WAKANO | "LEARNING SCHEDULES AND CUMULATIVE CULTURE" |
| 16:00-17:30 | YASUHISA KONDO | "ECO-CULTURAL NICHE MODELING" |

12/19 (Thu) Further Topics in Learning Strategies

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| 09:45-11:15 | KENICHI AOKI | "MIXED STRATEGIES AND EVOLUTIONARY STABILITY" |
| 11:15-13:00 | KENICHI AOKI | "WHY DO HUMANS TEACH, OR DO THEY?" |
| 14:15-15:45 | KENICHI AOKI | "EXERCISES IN EVOLUTIONARY STABILITY ANALYSIS" |

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明治大学先端数理科学インスティテュート
現象数学研究拠点



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