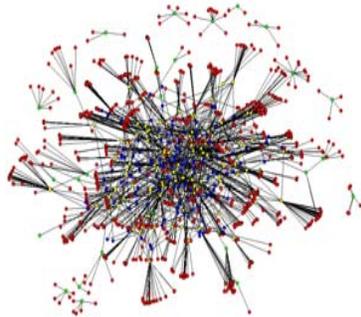


# Four-Campus Video-Conference Series, 2006-7 f-w-s

## Human Sciences and Complexity



**June 1, 2007: Friday, 1:30-3:00 telecast from UCLA 285 Powell Library**

**Michael Merrill, UCLA and ASU (Arizona State University)**

School of Human Evolution & Social Change

**“Archaeology and Galois lattices “**

<http://eclectic.ss.uci.edu/~drwhite/center/cac.html#Merrill>

**Abstract:** My analytical method is based on determining structure through representing the complexity of artifact data with Galois lattices. Galois lattices are dually ordered algebraic structures that provide a very robust and elegant conceptual framework for exploring structural patterning in archaeological data. The Galois lattice has a formally defined structure that incorporates set-theoretic principles such as set union and overlap in conjunction with other mathematical concepts that include least upper bound (supremum) and greatest lower bound (infimum), which are used to assemble a partially ordered set (the lattice). A Galois lattice is most often visualized in terms of a diagram (often called a Hasse diagram) consisting of nodes (lattice elements) and lines connecting the nodes. Each lattice node in this analysis is associated with one or more shell ornaments from a burial and/or one shell ornament type. The nodes of the computer generated lattice diagrams in my talk will be labeled accordingly. A specific property of Galois lattices known as the Luxenburger basis (Luxenburger 1991) will be used to uncover sets of absolute and partial (true most but not all of the time) implications or dependencies (also known as "association rules") between size classes of shell ornaments recovered from ten burials (a 10% sample size and excellent spatial coverage of a cemetery that was nearly completely excavated by David Banks Rogers in 1926) in a mainland coastal Chumash site occupied from approximately A.D. 900 to 1150. The impetus for the analysis is to find a way to explore further Chester King's comment that "the size of the shell determines the size of the callus ring in the center of the shell" (King 1990:125), which in turn determines the economic value of the shell as well as the exchange value, social context and use of the finished ornament. (Thanks to Chester King and Dwight Read without whom this research would never have taken place.)

### Video Conference Locations for Participants

**UCLA: 285 Powell Library**

**UCI: 3030 Teaching, Learning & Technology Center, corner E. Peltason and Anteater**

**UCSD: 260 Galbraith Hall**

**UCR: A139 Olmsted Hall**