



## Talks

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### Seminar Abstract

Thursday, September 11, 2008 • 12:15 PM • Medium Conference Room, SFI

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#### *Using Evolutionary Game Theory to Investigate Color Category Evolution in Artificial Agent Populations*

Simulation studies on the evolution of color lexicons were used to evaluate the role of two realistic constraints found in human categorization phenomena: (i) heterogeneous observer populations and (ii) heterogeneous color stimuli. Such constraints, idealized and implemented using agent categorization and communication games, produce interesting and unexpected consequences for stable categorization solutions evolved and shared by agent populations. Results show that the presence of a small fraction of color deficient agents in a population, or the presence of a region of increased salience in the color stimulus space, breaks rotational symmetry in population categorization solutions, and confines color category boundaries to a subset of available locations. Further, these heterogeneities, each in different, predictable, ways, seem to influence category number and size. In addition, the concurrent presence of both types of heterogeneity gives rise to novel constrained solutions that optimize the success rate of categorization and communication games.

#### Article Links:

Komarova, Jameson & Narens (2007). Evolutionary models of color categorization based on discrimination. *Journal of Mathematical Psychology*, 51, 359-382.

<http://aris.ss.uci.edu/~kjameson/KomarovaJamesonNarensJMP2007.pdf>

Komarova & Jameson (2008). Population heterogeneity and color stimulus heterogeneity in agent-based color categorization. *Journal of Theoretical Biology*, 253, 680-700.

<http://aris.ss.uci.edu/~kjameson/KomarovaJamesonJTB2008.pdf>

Jameson & Komarova (2008). Evolutionary models of color categorization: Investigations based on realistic population heterogeneity. Technical Report, Series MBS 08-04. Institute for Mathematical Behavioral Sciences, University of California at Irvine, Irvine, CA, USA.

<http://aris.ss.uci.edu/~kjameson/JamesonKomarovaSUBMITTED.pdf>

**Host: C. C. Wood**