

# SEMINAR

Theoretical and Computational Biophysics Group  
Beckman Institute

## **“Context sensitive information: Model validation by information theory”**

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Computer Science  
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**Monday, January 23, 2012**  
3:00 pm  
Room 3269 Beckman Institute

### *Abstract*

Learning patterns in data requires to extract interesting, statistically significant regularities in (large) data sets, e.g. detection of cancer cells in tissue microarrays and estimating their staining or role mining in security permission management. Admissible solutions or hypotheses specify the context of pattern analysis problems, which have to cope with model mismatch and noise in data. An information theoretic approach is developed which estimates the precision of inferred solution sets and regularizes solutions in a noise adapted way. The tradeoff between "informativeness" and "robustness" is mirrored in the balance between high information content and identifiability of solution sets, thereby giving rise to a new notion of context sensitive information. Cost function to rank solutions and, more abstractly, algorithms are considered as noisy channels with an approximation capacity. The effectiveness of the principle is demonstrated by model validation for spectral clustering based on different variants of graph cuts and by analyzing preference data to robustly extract total orders of ranked items.

2:30 pm: Coffee hour Theoretical and Computational Biophysics Group area, 3rd Floor Beckman