



# UMass Lowell Computer Science Colloquium Announcement

**Speaker:** Dr. Gary Ray Linvingston  
Dept of Computer Science, Univ. of Pittsburgh

**Date:** March 15, 2002

**Time:** 3:00pm - 4:00pm

**Place:** Olsen Hall 311  
Refreshments are served at 2:30pm

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## **A Framework for Knowledge-Guided Discovery from Databases**

This research evaluates the sufficiency of an agenda- and justification-based framework for implementing fully or mostly autonomous discovery systems. The proposed framework provides a reasoning component for the autonomous selection of discovery tasks which ranks them by their plausibility. A task's plausibility is computed from the interestingness of the items involved in the tasks and the strengths of justifications given for performing them.

Heuristics are used to perform tasks and to propose new tasks. The heuristics encode general knowledge about performing discovery but refer to domain-specific features, allowing them to be generally applicable, but tailor a discovery system's behavior to the discovery problem.

We evaluated the framework by implementing it in a prototype system called HAMB and using it to make discoveries from the domain of experimental conditions that favor the growth of crystals of DNA-protein complexes and proteins for X-ray crystallographic studies. Empirical results demonstrate that: (1) the framework's task selection component allows a discovery system to tailor its behavior to the user's preferences and to the data and discovery domain, (2) justifications given for performing tasks and estimates of the interestingness of items involved in the tasks are both useful in guiding the discovery process, and (3) the prototype and its framework are general.

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