



## UMass Lowell Computer Science Colloquium Announcement

**Speaker:** Dr. Witawas Srisa-an  
Dept of Computer Science, JHU

**Date:** March 4, 2002

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

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

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### **Active Memory Processor: A Garbage Collected Memory System**

Java possesses many advantages for embedded system development, including fast product deployment, portability, security, and small memory footprint. As Java makes inroads into the market for embedded systems, much effort is being invested in designing real-time garbage collectors. The Active Memory Processor is introduced to provide a hardware support for real-time garbage collection in embedded Java systems. The scheme yields constant time allocation and sweeping. The allocation delay is a few cycles and sweeping can be performed concurrently by multiple modules to allow constant time regardless of number of objects collected or total heap size.

Additionally, the proposed Active Memory Processor also supports single-bit reference counting in conjunction with mark-sweep. The proposed design allows setting of the reference count bit in a few cycles. The experimental results indicate that one-bit reference counting can reclaim more than 65% of the "no-longer-used" objects. Thus, the frequency of full collection is reduced by 76% and the marking speed up is about 5.81. As a result, the overall speed-up utilizing the proposed system can be as high as 42%.

#### **A Short Biography of Witawas Srisa-an**

Witawas Srisa-an received the B.Sc. degree in Science and Technology in Context and M.Sc. degree in Computer Science from Illinois Institute of Technology (IIT). In 1999, he received the Dean's Scholarship to pursue his Ph.D. study and joined the Computer Systems Laboratory at IIT under the direction of Dr. Morris Chang. He is presently a Ph.D. candidate in the Computer Science Department, Illinois Institute of Technology. He expects to graduate in May 2002.

From 1999 to 2001, he was an instructor in the Department of Computer Science at IIT. His courses were computer organization, advance computer architecture, and client/server application development. Currently, he is a predoctoral researcher at Iowa State University. His research interests include computer architecture, object-oriented programming, Java runtime systems, and dynamic memory management.

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