

Stony Brook News

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August 26, 2003
For Immediate Release

NSF Funds Software Engineering and Languages Program at Stony Brook University

The NSF has awarded \$345,000 to Stony Brook professor Annie Liu to fund a computer science project in which she is investigating a method for automatically transforming rules for analyzing complex data into efficient computer programs that have time and space guarantees.

STONY BROOK, NY - August 26, 2003 The NSF has awarded \$345,000 to Stony Brook professor Yanhong Annie Liu to fund a computer science project titled, "From Rules to Analysis Algorithms with Time and Space Guarantees," in which she will investigate a method for automatically transforming rules for analyzing complex data into efficient computer programs that have time and space guarantees. Analysis of complex data is at the heart of many computer applications, for business process management, data warehousing, biological analysis, etc. Relational rules allow these analyses to be expressed in a simple, convenient, and general way. Existing rule-based systems are based on general-purpose evaluators that incur significant time and memory overheads and whose performance for particular analysis problems is very difficult to predict. Implementing special-purpose analyzers for each analysis problem would be expensive and error-prone.

This project investigates and develops a unified method for automatically transforming rule-based specifications into efficient algorithms and implementations and for characterizing the specifications and the transformations to provide guarantees on the running time and space (memory) usage of the generated programs. The development is based on a general transformational method that makes computation proceed in an iterative and incremental fashion, analogous to integration by differentiation in calculus. The method also exploits sophisticated structures for compactly storing and efficiently accessing complex data. This research will significantly generalize and improve over the best prior results. It will enable faster and better development and implementations of reliable computer software for efficiently solving practical analysis problems. The results will be of great interest to high-tech companies with crucial businesses dependence on timely production of high-quality software.

This important research program comes at a critical time for Stony Brook's newly unveiled Center of Excellence in the Wireless Internet and Information Technology proclaimed by Governor Pataki on August 2, 2002 at a special press conference at Stony Brook University. The industry-driven Center represents a total investment of \$230M from state, federal and private sources and is expected to create thousands of high tech jobs throughout New York State.