

## **Waterloo Maple Becomes a Partner in Funding Research in Design Optimization**

### **University of Waterloo professor, Dr. John McPhee, Set to Develop Unified Modeling Techniques For Physical Systems**

**WATERLOO, Canada, July 24, 2000** - Waterloo Maple Inc., the leading provider of advanced software solutions for analytical and mathematical computation, announced today a contribution for a research grant under the third round of Ontario's Premier's Research Excellence Award program (PREA). Waterloo Maple's contribution combined with the provincial contribution totals nearly \$150,000. In addition to the financial contribution, Waterloo Maple is providing a technical commitment to aid in programming and development expertise within the Maple programming environment.

The PREA citation recipient is Dr. John McPhee, Associate Professor, Systems Design Engineering, University of Waterloo (UW), for his research involving the dynamic analysis and design optimization of general systems of interconnected bodies. Dr. McPhee has applied this fundamental research to robots, vehicles, satellites, mechanisms, and biomechanical systems. "With this research award and the strong support from Waterloo Maple, I can explore promising new avenues for using algebraic computing to improve the modeling, analysis, and design of physical systems," comments Dr. McPhee.

"This sponsorship expands Waterloo Maple's traditional support of basic research in mathematics and computer science into the engineering fields", said Jim Cooper, vice president of research and development for Waterloo Maple. "Dr. McPhee's research is well aligned with the future direction of our company's development. His research has the potential to greatly enhance our current product offering and we would like to work closely with him in the long term."

The objective of Dr. McPhee's research is the development of new and improved methods of analyzing the dynamics of physical systems. A unified modeling theory that is applicable to a broad range of mechanical, electrical, and multidisciplinary problems, including robots and vehicles, will be created using systems theory. This new modeling approach will be combined with recent developments in algebraic computing, in which equations are represented in symbolic form rather than as abstract data structures. The resulting computer-aided design tools will automatically generate system models in an efficient human-readable form that is easily communicated either on paper or via the Internet.

These symbolic models will lead to physical insight into the underlying system dynamics, and will facilitate the design of real-time controllers and simulations, including virtual reality applications. By relieving a research engineer of the laborious and error-prone task of dynamic modeling and analysis, more time can be spent on the control of existing systems, or on the creative design of new products. With strong support from Waterloo Maple Inc., this research has the potential to reach a very wide audience.

The PREA is investing \$75 million over 10 years to help world-class researchers at universities, colleges, hospitals and research institutes attract talented people to their research teams. The

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awards program will help to ensure that Ontario attracts and retains the pre-eminent researchers needed to keep Ontario's research capacity at an international level of excellence. The program supports training for graduate students, postdoctoral fellows and research associates.

**About Waterloo Maple** Founded in 1988, Waterloo Maple is a world leader in mathematical and analytical software. The Maple system embodies advanced technology such as symbolic computation, infinite precision numerics, and a powerful 4GL language for solving a wide range of mathematical problems encountered in modeling and simulation, and in technical education. Over a million users have adopted Waterloo Maple products as their preferred platform for exploring and managing complex problems in engineering, science, mathematics, and education. Waterloo Maple supports the most extensive research partnership network in the industry. Waterloo Maple maintains research partnerships with the University of Waterloo, University of Western Ontario, Simon Fraser University, Swiss Federal Institute of Technology, Moscow State University, and INRIA, France (Institut National de Recherche en Informatique et en Automatique). This research activity combined with Waterloo Maple's own research and development group has established Waterloo Maple's reputation as the technology leader in analytical computation.

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