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THE AUTOMOBILE OF THE 21ST CENTURY – L'AUTOMOBILE DU XXI^E SIÈCLE

University of Windsor Researchers Help Enhance Rapid Prototyping Processes for Automotive Parts Makers

For immediate release

June 11, 2003

Windsor, ON: Being off by a fraction of a millimetre on the dimensions of a part can result in a mistake worth thousands of dollars for auto part makers. Rapid prototyping machines can uncover some of these discrepancies, but not all. A team of university researchers has developed an innovative computer model program that can help eliminate these inaccuracies. On June 18, 2003, Dr. Hoda ElMaraghy of the University of Windsor will present some of the team's findings at the AUTO21 Scientific Conference in Niagara-on-the-Lake, Ontario.

Dr. ElMaraghy, a Canada Research Chair and professor in industrial and manufacturing systems engineering and a project leader for the AUTO21 Network of Centres of Excellence, is leading the team in its quest to enhance design for rapid manufacture. She says rapid prototyping machines are used to test the form, feel and function of new part designs before actual production, but they can introduce some errors.

"The computer program we've developed simulates the construction of prototyped auto parts, and determines the minute dimensional adjustments required on the CAD model to ensure the generated rapid prototyped parts are true to the original design," says Dr. ElMaraghy. "Rapid prototype machines are helpful in building initial models, but they are also inaccurate to a certain degree. Our computer program helps eliminate the effect of these inaccuracies and allow true verification of precise assemblies."

The team's next steps are to integrate the computer model into a planned virtual prototype tolerancing environment to ensure rapid prototypes follow the part designer's intent for precise assembly. As part of the AUTO21 Network, Dr. ElMaraghy coordinates the work of researchers from the University of Windsor, the University of Sherbrooke and the University of Quebec at Trois-Rivières.

The AUTO21 2003 Scientific Conference will take place June 16-18, 2003 at the White Oaks Conference Resort in Niagara-on-the-Lake. Dr. ElMaraghy's presentation is scheduled for 11:15 a.m.-11:45 a.m. on Wednesday, June 18. The conference is an annual event that highlights some of the Network's recent research results while providing a networking opportunity for the Network's 450 university and student researchers and additional industry and government representatives.

Other conference presenters include Michael Grimaldi, President of General Motors of Canada, and Gerald Fedchun, President of the Automotive Parts Manufacturers Association.

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The Government of Canada awarded the AUTO21 Network of Centres of Excellence an initial four-year grant of \$23 million in 2001 to help it enhance Canada's position as a world leader in automotive research and development. Researchers at 32 Canadian universities are working on innovative, auto-related projects in the areas of health, safety and injury prevention; societal issues; materials and manufacturing; design processes; powertrains, fuels and emissions; and intelligent systems and sensors. In addition to the federal grant, AUTO21 is supported by industry, government and institutional contributions of \$11 million.

Networks of Centres of Excellence are unique partnerships among universities, industry, government and non-governmental organizations aimed at turning Canadian research and entrepreneurial talent into economic and social benefits for all Canadians. An integral part of the federal government's Innovation Strategy, these nation-wide, multidisciplinary and multisectorial research partnerships connect excellent research with industrial know-how and strategic investment.

Three Canadian federal granting agencies - the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council of Canada (SSHRC) - and Industry Canada combine their efforts to support and oversee the NCE initiative.

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