



## Aluminum gets tough

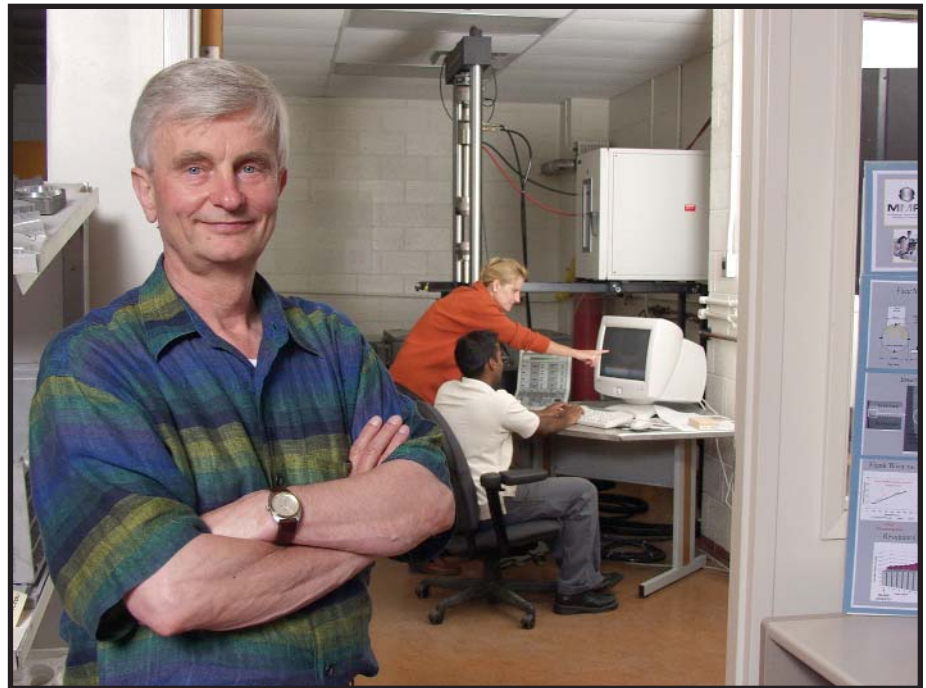
**A**luminum would be an outstanding material for engine blocks and their associated components. It is light, versatile, easy to work with, and cost effective. Now if only it did not fail at the high temperatures and pressures to be found under the hood.

That shortcoming has overshadowed the virtues of aluminum for most manufacturers. However, Dr. Jerry Sokolowski and his team are well on their way to solving this problem. As leader of the project *Advanced Casting of Light Materials*, he is guiding research into a new generation of aluminum alloys that are ready to be used in the most hard-working engines.

“We have a process that has exhibited profound improvements in all as-cast structures, to a level that has never been seen in any sand-casting to date,” he says. More specifically, the Nemark plant in Windsor was recently able to turn out aluminum engine blocks with 70 per cent less porosity than before, and a 40 per cent improvement in high cycle fatigue.

“It was very impressive,” says Dr. Sokolowski, who notes that the result caught the attention of representatives from Volkswagen, one of the few manufacturers currently using aluminum in engines.

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Dr. Jerry Sokolowski of the University of Windsor leads the *Advanced Casting of Light Materials* project.

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## AUTO21 Board of Directors Update

*Following its annual general meeting in June 2004,*

*AUTO21 is pleased to announce several changes to its board of directors.*



Norman Lockington

### New Chair

June 2004 marked the completion of Jim Miller's two-year term as board chair. Jim passed the title of board chair to **Norman Lockington**, vice-president of technology for Dofasco Inc. We thank Jim for his two years of expert guidance and leadership, and we look forward to Norm's tenure as

chair. Norm has been a member of the AUTO21 board of directors since 2001.

"The AUTO21 board and staff are a terrific group of people. Their vision, commitment and attention to detail is not only rewarding, but a lot of fun," said Norm.



John McDougall

### New Vice-Chair

With Norm Lockington's move to board chair, the new vice-chair is **John McDougall**, president and CEO of the Alberta Research Council. John has been a member of the board since 2001, and has served on its finance committee.



Ann Herten

### New Members

AUTO21 welcomed two new members to the board. **Ann Herten** is the director of human resources for the Woodbridge Group. Having recently returned from a four-year assignment in Belgium and Germany, Ann is now focused on developing an emerging business unit at

Woodbridge where human development and technological innovation are paramount. She has served on various automotive industry committees including the Automotive Parts Manufacturers Association human resources committee and as chair of the automotive technology advisory committee at Georgian College.

"As a member of the AUTO21 board, I am interested in viewing Canada's automotive industry through the 'sustainable development' lens whereby aiming to ensure its social responsibility, economic growth and environmental performance. This, coupled with the pragmatic support of Canada's highly qualified innovative thinkers, is a good formula for ensuring our competitiveness in this very global industry," said Ann.



Bob Séguin

**Bob Séguin** is the assistant deputy minister of the competitiveness and business development division for Ontario's Ministry of Economic Development and Trade. In this capacity, Bob is involved with automotive, aerospace, steel, chemical/plastic and retail sector analyses. He has been involved in various trade policy disputes and WTO negotiations, the

Ontario innovation agenda, access to capital discussions, support for the Red Tape Commission and urban economic development policy and also the planning and implementation of the Task Force on Competitiveness, Productivity and Economic Progress.

"I'm impressed with the high calibre of the board members and AUTO21's research. I'm looking forward to working with the board to help Canada sustain its future in the auto industry, a key economic cluster," said Bob. "Being a board member allows me to see the latest developments in automotive research in a broader context rather than just one key area."



Dr. Jan Miller Polgar

### Network Researcher Representative

**Dr. Jan Miller Polgar**, project leader of the *Safe Transportation for Seniors* and *Vehicle Safety for Vulnerable Populations* projects, has been elected by her fellow network researchers to her second year as the network researcher representative on

the board. Dr. Miller Polgar is a professor of occupational therapy at the University of Western Ontario. ■

*June 2004 marked the completion of Jim Miller's two-year term as board chair... We thank Jim for his two years of expert guidance and leadership...*



**From the  
*Program Leader***

*Dr. Peter Frise*

**S**ummer was a busy time for AUTO21. In June, we hosted our 2004 Scientific Conference in Montreal, Quebec. It was an excellent event with insightful speakers and more than 225 attendees. You can read about the event highlights on page 4.

During the conference, AUTO21 held its 2004 annual general meeting. There were several changes to the Network's board of directors, including the conclusion of Jim Miller's two-year term as board chair. Jim is the senior vice-president of corporate affairs for Honda Canada, and has been a member of the board since 2001. We appreciate the guidance and support Jim provided as the chair of our board, and we look forward to his continued support as a director at large on the board. We are pleased to welcome Norman Lockington, vice-president of technology for Dofasco Inc. as the AUTO21 board chair for 2004-2006. You can read about Norm and our two newest board members on page 2.

Also in June, AUTO21 launched a call for proposals for new project funding. More than 85 letters of intent were received by the June 30<sup>th</sup> deadline. Following an initial review by the Research Management Committee (RMC) and the Scientific Advisory Committee, a number of research teams were invited to submit full project proposals. These proposals were to be submitted by September 30<sup>th</sup>, and will be reviewed and evaluated by the Network's RMC, an external review panel, the scientific advisory committee and the board of directors. AUTO21 expects to announce the new funding recipients in March 2005.

AUTO21 will participate in several events this autumn. On September 30<sup>th</sup>, we are pleased to take part in the Canadian Microelectronics Corporation (CMC) annual symposium in Ottawa. We will also exhibit at the annual conference of the Association of Canadian Ergonomists in Windsor, Ontario in October. We also look forward to seeing many of our researchers at Convergence 2004 in Detroit, Michigan. Convergence is the international congress on transportation electronics and is an excellent place to see the leading-edge technologies from automotive and parts manufacturers. More information on this exciting event can be found online at [www.convergence2004.org](http://www.convergence2004.org). ■

## Aluminum gets tough

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This success follows some intensive studies of alloys using varying amounts of copper and silicon, as well as different cooling rates for the castings. The centrepiece of this work has been a collection of alloys known as the 3xx.x series, which proved durable enough to be used in cylinder liners.

This considerable volume of analyses was made possible by Dr. Sokolowski's use of a compact, self-contained workstation designed and built on campus, turning out small batches of each alloy with maximum efficiency. "It allows us to melt, treat the melt, solidify the melt, and do the heat treatment – the complete cycle," he explains.

This particular project is incorporating the efforts of researchers from the University of Windsor, McMaster University, and the CANMET Energy Technology Centre in Ottawa, a research branch of Natural Resources Canada. Dr. Sokolowski holds the NSERC/Ford-Nemak/University of Windsor Industrial Research Chair (IRC) in Light Casting Technology, enabling him to bring industrial partners such as Nemak to this work.

Nemak, based in Monterrey, Mexico, is one of the world's leading makers of cast aluminum components. The company, which provides cylinder heads and engine blocks to Ford plants across North America, has also established a major plant in Windsor. ■

# 2004 Scientific Conference

## A Success!

No matter what one's interest, the AUTO21 Scientific Conference offered something for everyone on its agenda. For two days, more than 225 delegates from across Canada converged on downtown Montreal for the latest in automotive research, industry speakers, facility tours, networking opportunities and some plain old fun.

In addition to the AUTO21 research presentations, delegates were impressed with the range of industry speakers, who offered expertise on everything from launching an innovative new concept car, to emerging worldwide markets, to meeting the challenges of running an assembly plant in today's changing automotive climate, to a thought-provoking scenario of what driving in 2050 will entail.

Planning has already started for next year's conference to be held in late spring 2005. See you there!

### DaimlerChrysler HQP Poster Award Winners

With anticipation building for the six weeks between the HQP Conference and Scientific Conference, the four finalist teams in the DaimlerChrysler HQP Poster Competition were happy to hear the final results at the opening banquet on June 15<sup>th</sup> in Montreal. Earlier that day, the teams presented short oral summaries of their research to members of the AUTO21 Scientific Advisory Committee who then had the difficult task of ranking the four teams from first place to fourth.

"DaimlerChrysler Canada extends congratulations to the winners and to everyone who participated in this year's poster competition.

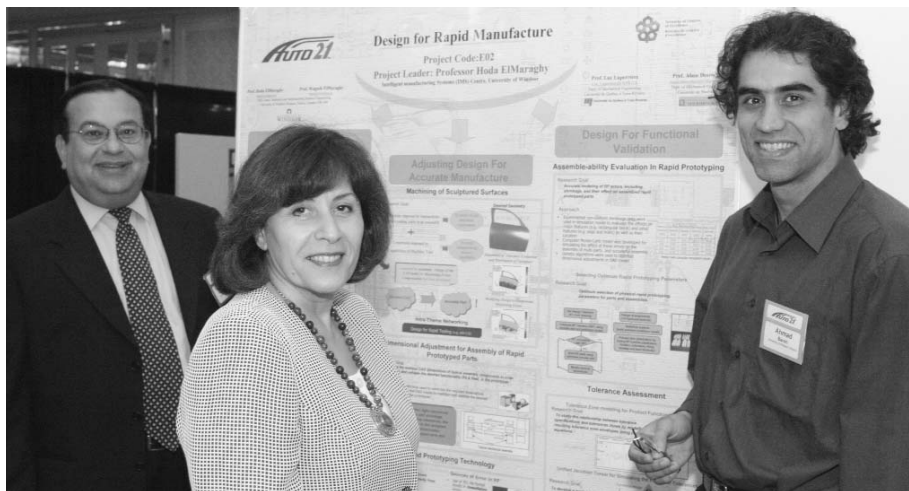
The quality of all the entrants was outstanding and exhibits the future strength of automotive research and

development in Canada," said John Mann, director of engineering, DaimlerChrysler Canada. ■

**AUTO21 appreciates the support of DaimlerChrysler Canada, who provided a total prize purse of \$15,000 for the competition. The prize money was divided between the final round of judging at the Scientific Conference and previous rounds of judging at the HQP Conference in May 2004. More than 60 student teams entered the competition. All contribute to AUTO21 research.**

<b>First Place</b>	Industrial Health and Safety in the Auto Industry University of Windsor	<b>\$4,500</b>
<b>Second Place</b>	Welding and Joining University of Waterloo	<b>\$3,000</b>
<b>Third Place</b>	New Generation Steels Queen's University	<b>\$1,500</b>
<b>Fourth Place</b>	Interior Noise Environment of the Future Automobile Simon Fraser University	<b>\$1,000</b>

## Design for Rapid Manufacture Honoured



The other winner at the Scientific Conference was the *Design for Rapid Manufacture* project led by Dr. Hoda ElMaraghy of the University of Windsor. The project was selected for the Best Booth Award at the conference and received a \$4,500 cash prize.



In addition to providing the keynote address at the opening banquet, Ray Tanguay, president of Toyota Motor Manufacturing Canada Inc. toured the poster exhibition to learn more about the Network's research.



Jim Gouin, vice-president and controller for Ford Motor Company, provided an interesting presentation on one of the most successful automakers in the world.



AUTO21 thanks the members of the Scientific Advisory Committee who met the challenge of judging 36 booths and four HQP posters.

AUTO21 is pleased to donate approximately 20,000 Starwood Preferred Guest points accumulated from conference expenses at Le Centre Sheraton to the Yves Landry Foundation. These points will assist the non-profit organization reduce its travel costs as it promotes skilled trade education to secondary students across Canada.



**Special thanks to the following organizations for allowing AUTO21 delegates to tour their facilities:**

- National Research Council**
- Industrial Materials Institute**
- PMG Technologies Test Track**

**AUTO21 appreciates the support and assistance provided by this year's conference sponsors:**

- Canadian Consulate General - Detroit
- Canadian Microelectronics Corporation (CMC)
- Canadian Vehicle Manufacturers Association
- DaimlerChrysler Canada
- Decoma International
- Dofasco Inc.
- Ford Motor Company of Canada
- General Motors of Canada
- Golden Planners Inc.
- Honda Canada
- Japan Auto Manufacturers Association
- Magna International
- Ministère de Développement économique et régional et Recherche du Québec
- PricewaterhouseCoopers
- Solectron InvoTronics
- Toyota Canada
- Transport Canada
- University of Windsor

*HQP Profile:*

## Ali Asadkarami, University of British Columbia



While pursuing his PhD at the University of British Columbia, Ali is developing ways to reduce injuries from side-impact crashes.

Side impact crashes can cause serious injuries to vehicle occupants. With the help of a fellowship provided by the Woodbridge Group and the Canadian Institute for the Relief of Pain and Disability, an AUTO21 HQP researcher is investigating ways to enhance the safety of vehicle side panels.

Ali Asadkarami is pursuing his PhD at the University of British Columbia (UBC) under the supervision of Dr. Doug Romilly, an associate professor of mechanical engineering. Under Dr. Romilly's direction, Ali is contributing to the *Crash Investigations - Outcomes for Vehicle Design* project.

Specifically, Ali is developing an index that can be used as a design guide to verify a vehicle structure's crash worthiness.

Such an index currently doesn't exist for side impact crashes. Instead, designers rely on indexes based on crash test dummies to determine how panel design behaves in a crash situation. Ali's index will eliminate or lessen the use of crash test dummies from the design process while increasing the accuracy of real and simulated testing and also reducing associated testing costs.

Ali says the \$20,000 fellowship is helping him immensely, as is his participation in the AUTO21 Network. "The HQP Conferences have been good experiences. They allow you to see what other student researchers are doing and look for links between your own work and others. It's also a great place to make new friends."

Prior to enrolling at UBC, Ali completed his MSc. in mechanical engineering at the Iran University of Science and Technology, and his BSc. in mechanical engineering with a specialty in solid body mechanics at the Amirkabir University of Technology in Iran. He began his PhD in January 2003, and he hopes to finish the degree in 2006. Following completion of his PhD, Ali hopes to continue research in this area as a post-doctoral fellow or in the research and development area of an automaker. "I'd like to continue to increase and share my knowledge in this area with OEMs." ■

### HQP Researcher Awarded for AUTO21 Research

A University of Windsor student contributing to the *Safety Restraint of Children During Collisions* project was recently awarded two scholarships. Tanya Kapoor is currently pursuing her MSc. in mechanical engineering under the supervision of Dr. Bill Altenhof. Tanya received a \$2,500 U.S. scholarship from the Automotive Women's Alliance and a \$5,000 Canadian Bloorview-McMillan graduate scholarship. In addition to these two awards, Tanya is also the recipient of a \$20,000 fellowship from the Woodbridge Group and the Canadian Institute for the Relief of Pain and Disability. Congratulations Tanya!

**AUTO21 would like to hear from other HQP researchers about prizes or awards received. Please send information to [info@auto21.ca](mailto:info@auto21.ca).**



AUTO21 Network  
of Centres of Excellence  
University of Windsor  
401 Sunset Avenue, Windsor, Ontario  
N9B 3P4

(519) 253-3000, ext. 4130  
[info@auto21.ca](mailto:info@auto21.ca)  
[www.auto21.ca](http://www.auto21.ca)

Program Leader: Dr. Peter Frise  
Managing Director: Mr. Bill Woodward

Editor: Ms. Stephanie Campeau  
Communications Manager  
(519) 253-3000, ext. 4129



Member of the Networks of Centres of Excellence of Canada  
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## New Funding Helps HQP Researchers

**A** commitment of \$300,000 by a leading Canadian automotive supplier to health, safety and injury prevention research is paying off for some AUTO21 HQP researchers. The Woodbridge Group, a major supplier of integrated automotive solutions and urethane products, is providing the funding to the Canadian Institute for the Relief of Pain and Disability (CIRPD) to further research in the areas of health, safety and injury prevention. Together with CIRPD, AUTO21 administers the funding through fellowships to students conducting research in this area.

“The Woodbridge Group looks forward to the innovations that result from these fellowships,” said Heather Harvey, director of health, safety and the environment - worldwide of the Woodbridge Group. “We are pleased to help the future innovators of the Canadian automotive sector jumpstart their research.”

Four AUTO21 HQP researchers have already been awarded fellowships, each in the amount of \$20,000. Two students contribute to the *Crash Investigations - Outcomes for Vehicle Designs* and the *Safety Restraint of Children During Collisions* projects. The other two fellowships were provided in conjunction with the Canadian Institute of Health Research (CIHR) for students working on the *Industrial Health and Safety in the Auto Industry* and the *Safe Transportation for Seniors* projects.

“The most effective way to address the risk of unnecessary pain and suffering resulting from motor vehicle accidents is through the investment in research focused on innovation in auto-engineering and traffic safety,” said Dr. Marc White, executive director of the Canadian Institute for the Relief of Pain and Disability.

AUTO21 is accepting letters of intent from interested researchers in support of students studying issues related to health, safety and injury prevention. Information can be obtained from the AUTO21 administrative centre or on [www.cirpd.org](http://www.cirpd.org).

Dr. Peter Frise, AUTO21 program leader and CEO, is appreciative of the Woodbridge Group's support. “Thanks to the Woodbridge Group and the Canadian Institute for the Relief of Pain and Disability, these matching funds will surely enhance the work of AUTO21's graduate student researchers.” ■



Heather Harvey of the Woodbridge Group announced the company's commitment to health and safety research at the AUTO21 Scientific Conference in June.

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## Dealing with driving demographics

**A**s the average age of North American drivers goes up, so too does the likelihood that these drivers will have a serious accident on the road. Many of them will no longer possess the necessary physical or mental skills to operate safely behind the wheel. Yet many will also be loathe to surrender their licenses, given how integral the automobile is to our way of life.

This rapidly emerging issue occupies the intersection of three AUTO21 projects, where researchers are exploring the challenges facing the current generation of drivers as they age, and the kind of technology that could enable them to keep driving as long and as safely as possible.

“The problems for older drivers tend to be with distraction,” says Lakehead University psychology professor Michel Bédard. “Their ability to divide attention is not as good as that of a younger person. We have to be careful of the distractions we place in a vehicle.”

Besides holding a Canada Research Chair on Aging and Health, Dr. Bédard co-leads the AUTO21 project *Safe Transportation for Seniors*. He is assessing the value of retraining programs for older drivers, as well as examining how vehicle design affects the performance of such drivers.

This work has brought him into a close collaboration with University of Western Ontario occupational therapy professor Jan Miller Polgar, also co-leader of the *Safe Transportation for Seniors*. She echoes his call to understand the demands that confront drivers of any age.

“Driving is such a complex task, but we don’t really think about how complex it is,” she says. “Many seniors, as long as they’re cognitively intact, do realize how complex this thing is, and

they realize how much more attention they have to pay to it now than they did when they were younger.”

Through surveys and laboratory work, Dr. Miller Polgar and her colleagues have documented some of the safety strategies adopted by senior drivers. Many leave the radio off, and insist that passengers not talk to them. Some even refuse to take their hands



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off the wheel, an extreme measure that is problematic, since it means they cannot properly work other controls such as the turn signal.

Manufacturers should therefore think carefully, she adds, when it comes to adding more instruments and readouts to their vehicles.

“Seniors’ capacity is really changing with respect to vision, mobility, and cognition,” says Dr. Miller Polgar. “If you overload the dashboard, you’re going to overload them.”

In fact, says Carleton University civil and environmental engineering professor Ata Khan, all aspects of the automotive environment could benefit from this kind of review.

“Aging drivers require better infrastructure, meaning better facilities – better traffic controls, better cars, better driving assistance, and so on,” says Dr. Khan, co-leader of AUTO21’s *Canadian Automobile Research Simulation* project. Using microsimulations and driving simulators to determine the effectiveness of radar systems that could warn drivers about potential crash hazards, he notes that younger drivers should likewise welcome these innovations, provided they integrate smoothly with their current driving habits.

Above all, Dr. Bédard points out, the overall aim is one of maintaining the quality of life of this broad segment of the Canadian population.

“It’s very important to support older drivers, not to take them off the street,” he says. “The objective is to make sure they drive as safely as possible.” ■