AUTO21 NETWORK OF CENTRES OF EXCELLENCE

Auto INNOVATIONS

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Portrait of a Thief:

Young Offenders and Vehicle Thefts

Car theft can be a big business, with organized crime shipping stolen vehicles around the world. More often, however, car theft simply amounts to a few hours of fun.

"In many cities, auto theft is not primarily a financial crime, it's a crime of adventure and transportation," says Rick Linden, a criminology professor at the University of Manitoba and leader of the AUTO21 *Young Offenders and Vehicle Thefts* project. "It's become a fad among young people. They're just using it partly as a rapid transit system, and partly as a form of amusement and thrill."

In fact, teenagers convicted of stealing cars tell stories about simply taking a vehicle to travel from one shopping mall to another, or to transport a few friends during a school lunch break.

Dr. Linden, who chairs the Manitoba Anti-Auto Theft Task Force, was asked by the province to study this issue in 2002. Graduate student Jeff Anderson conducted interviews with 43 young offenders, making this one of the most detailed investigations ever into the habits, motivations, and backgrounds of car thieves.

This research was supported by Manitoba Public Insurance, the provincial auto insurance agency, which is well motivated to examine the topic. Winnipeg has one of the highest rates of auto theft in North America, with upwards of 10,000 vehicles stolen annually.

The survey revealed common qualities of young car thieves, including poor academic performance, single-parent family life, and drug use. With friends who also tend to be car thieves, these teenagers learn to disable or skirt some of the most sophisticated alarm systems. "Some 12 year olds," says Dr. Linden, "can start a vehicle with a screwdriver as quickly as anyone else might do with key."

The physical security of vehicles has become a priority for manufacturers, he adds. DaimlerChrysler, for example, is installing its most effective electronic

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Board of Directors Member Profile

Dr. Jan Miller Polgar

Dr. Jan Miller Polgar, is the researcher representative on the AUTO21 Board of Directors.

As a research organization, it's important that the concerns of researchers be brought to the attention of the AUTO21 Board of Directors. To help facilitate this process, one Board seat is reserved for a researcher representative. In June 2003, Dr. Jan Miller Polgar was elected to fill this role.

Dr. Miller Polgar is an associate professor of occupational therapy at the University of Western Ontario. She is also the co-project leader for the *Vehicle Safety for Vulnerable Populations* and the *Safe Transportation for Seniors* projects.

AI: What do you hope to accomplish as the researcher representative to the Board?

JMP: I want to bring the issues of concern for researchers to the table. I'm there on their behalf.

I'm learning a lot about the governance of an NCE. As a researcher, there's little exposure to this aspect of the Network. The Board is very committed to ensuring the success of AUTO21 and it's wonderful to be part of it.

AI: How has your experience been so far?

JMP: My background is in health sciences, and my experiences with the auto industry have been primarily in this area. As a Board member, I'm exposed to other aspects of the auto industry. It's very interesting to learn about the current technologies and where things are heading for the future.

One thing that is consistent throughout AUTO21 is the quality of people. The researchers, the board members, and the administrative staff are all highly skilled in what they do. Personally, I find that my involvement with the Network has opened up new avenues for me.

AI: What do you think is AUTO21's strength?

JMP: AUTO21 is great for establishing links with other researchers. I have met many people and developed new research opportunities to explore.

I think the true strength lies in the development of highly qualified people (HQP) through the funding of graduate-level students. AUTO21 funding has allowed me to fund and support some excellent students. Participating in AUTO21 is a tremendous opportunity for students. It's been wonderful to watch the students become involved in the research, become familiar with other related work being done in other disciplines and establish connections they'll use in the future. ■

AUTO21 Researchers Receive Awards and Funding

AUTO21 would like to congratulate the following researchers on recent accomplishments:

Dr. Bill Altenhof of the University of Windsor for being awarded a 2004 Ralph R. Teetor award from the Society of Automotive Engineers (SAE). Dr. Altenhof is a researcher on the *Safety Restraint of Children During Collisions* project. The Ralph R. Teetor award emphasizes the opportunity for young engineering educators to meet and exchange views with practicing engineers. This interaction enhances the abilities of the engineering educator to assist and prepare their students for their future engineering careers. Dr. Altenhof will receive the award at the SAE World Congress in March 2004.

The *Sheet & Tube Forming* project led by Dr. Michael Worswick of the University of Waterloo recently received $180,000 over three years from the provincially-funded Centre for Automotive Materials and Manufacturing (CAMM). The funding will allow the researchers at Waterloo to purchase equipment that will greatly assist with the project's investigations in hydroforming high-strength steels.

Kevin Kavanaugh

Dr. Bil Altenhof

Bryn Gladding

Dr. Michael Worswick

AUTO21 *is proud of the accomplishments of its researchers. If you have recently received a professional award please let us know by sending an email to info@auto21.ca* ■

From the *Program Leader*

Dr. Peter Frise

Happy New Year! We are looking forward to 2004 as AUTO21 enters its fourth year of operation. A high level of activity has carried over to the new year, including the exploration of international collaborations. In late fall, the Administrative Centre hosted a delegation from France who were interested in learning more about AUTO21's innovative research. Dr. Denis Gingras, Theme F coordinator and professor at the Université de Sherbrooke, provided an excellent presentation on behalf of AUTO21. The delegation was most impressed, and we look forward to continuing discussions.

On another part of the globe, the Tokyo Motor Show presented an opportunity to travel to Japan and meet with several representatives interested in AUTO21. There are some excellent opportunities for AUTO21 researchers to collaborate with Japanese automotive researchers, and we will be further exploring these prospects. In addition to the two countries named here, AUTO21 continues to work with Canadian consulates and research institutes and trade organizations from around the world.

We have had excellent talks with Norwegian researchers on key issues of common interest.

Planning for the 2004 HQP Conference is also underway. The event will be held in Windsor, Ontario on May 4, 5 and 6. HQP will participate in a poster competition to win cash prizes, attend research presentations and facility tours, and network. Registration information will be sent to all researchers to share with HQP in March.

I am especially excited that this year's AUTO21 Scientific Conference will be held in Montreal, Quebec on June 15 to 17. Confirmed speakers include Dr. Geoffrey Ballard, a pioneer in the Canadian fuel cell industry, Michael Robinson, Director of Design at Centro Stile Fiat, who will speak about the future intelligence of vehicles, and Ray Tanguay, President of Toyota Motor Manufacturing Canada Inc. It's shaping up to be an exciting event.

As always, visit www.AUTO21.ca for the latest news and event information. ■

Portrait of a thief:
Young Offenders and Vehicle Thefts

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disabling systems on popular models such as family minivans and compact cars.

Dr. Linden and the other AUTO21 project researchers now want to study the effectiveness of such measures. This information, which has previously been assessed only superficially, is essential to understanding what it will take to reduce auto theft rates.

"There's lots of kids stealing lots of cars," he says. "And probably the only feasible way of stopping them is with technology." ■

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Membre des Réseaux de centres d'excellence du Canada

AUTO21 2004 Scientific Conference

Le Centre Sheraton, Montreal, Québec

Join us for AUTO21 *research presentations, industry speakers, poster competitions, facility tours and networking opportunities*

June 15-17, 2004

Check www.auto21.ca for registration details in late January

Speakers include:
Dr. Geoffrey Ballard, Michael Robinson and Ray Tanguay

Dr. Geoffrey Ballard, president of General Hydrogen Corporation. Pioneer of the Canadian fuel cell industry

Michael Robinson, Director of Design at Centro Stile Fiat Expert in emotional intelligence and DHMI (Digital Human Machine Interface)

Ray Tanguay, president of Toyota Motor Manufacturing Canada

AUTO21 Invests in New Automotive Research Projects

Dr. David Checkel of the University of Alberta is leading the new project "Electronic Controls for VVT and HCCI Combustion."

Photo: Richard Siemens, photographer, Creative Services, University of Alberta.

In November 2003, AUTO21 welcomed several new research projects to its portfolio. Seven projects investigating key issues in the automotive sector were added to the 28 already underway. Representing up to $1.8 million in AUTO21 funding, the projects will also receive up to $4.7 million from industry and public sector contributors, for a total investment of up to $6.5 million.

The projects were selected from a call for proposals held by the Network in spring 2003. Following a thorough scientific evaluation process, the seven were selected for their research excellence and potential contributions to Canada's automotive sector. This is the first expansion of AUTO21's research portfolio since its inception in 2001.

"We are very pleased to assist these researchers attain world-class results in Canadian universities," says Dr. Peter Frise, AUTO21 Program Leader. "In addition to the development of leading-edge knowledge and technologies required by the automotive sector, these projects provide graduate and post-graduate students an opportunity to work in an academic research setting with strong industry collaboration."

The new projects add 33 researchers and 53 highly qualified people (HQP) to the AUTO21 team. More than 250 university and industry researchers and over 250 HQP are already part of AUTO21. ■

In addition to AUTO21 funding, the following companies are supporting the seven new projects:

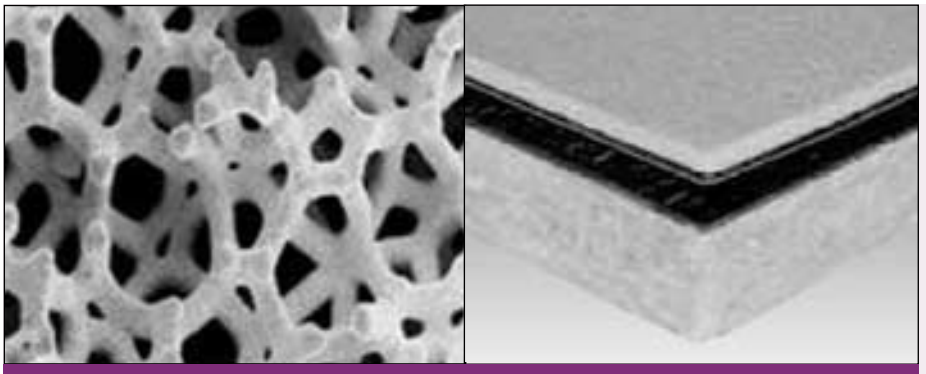
AAA Foundation for Traffic Safety
AGS Taron
Alberta Science and Innovation
Bombardier Aerospace
Centre for Automotive Materials and Manufacturing
Co-operators Insurance
CPI Innovation
Centre for Transportation Engineering and Planning
DaimlerChrysler
Ford Motor Company
General Motors of Canada
Hydrogenics Inc.
Kingston Process Metallurgy
MTS Powertrain
National Research Council - IMI
National Research Council Institute for Fuel Cell Innovation
Ontario Ministry of Economic Development
Ontario Ministry of Transportation
PalCan Fuel Cells Ltd.
Physical Medicine Research Foundation
RTI Inc. (USA)
Société de l'Assurance Automobile du Québec
Transport Canada
Transport Québec
Woodbridge Foam Corporation
Young Drivers of Canada

AUTO21 welcomes its newest institutional partners:
Lakehead University
University of Ontario Institute of Technology

New Research Projects	Leaders/University
Theme A: Safe Transportation for Seniors	Dr. Michel Bédard/Lakehead University Dr. Jan Miller Polgar/ University of Western Ontario
Theme B: Evolution of Life Cycle Assessments	Dr. Heather MacLean/ University of Toronto
Theme C: Composite Acoustic Materials for Noise and Vibration Control	Dr. Noureddine Atalla/ Université de Sherbrooke
Theme D: Electronic Controls for VVT and HCCI Combustion	Dr. David Checkel/University of Alberta
Theme D: Chemical Hydrogen Storage Process Development	Dr. Boyd Davis/Queen's University
Theme D: PEM Fuel Cells and Related Technologies	Dr. Xianguo Li/University of Waterloo
Theme F: Canadian Automobile Research Simulation (CARS)	Dr. Jeff Caird/University of Calgary Dr. Ata Khan/Carleton University

Further information on the seven new projects can be found on www.auto21.ca.

Sounding Off: Blocking Noise within Vehicles



Design of high performance materials needs detailed modeling and characterization of their microstructures. The modeling of composite sound packages is becoming easier thanks to methodology advances of individual components.

We need to find ways of coming up with smart solutions that don't cost much to put into cars before you even start doing testing.

Auto manufacturers used to have plenty of room where they could put basic, sound absorbing foam. Today's lighter, thinner vehicle frames lack the space for the same volume of acoustic insulation.

For Université de Sherbrooke mechanical engineering professor Noureddine Atalla, that means the insulation itself has to become much more sophisticated. As leader of the AUTO21 project, *Composite Acoustic Materials for Noise and Vibration Control*, he is designing sound control systems that will make traditional foams look as outdated as an oversized 1960s sedan.

Classical insulators blocked sound waves rather than absorbing them. In the case of low frequency sound, they did not even block very well. Dr. Atalla is therefore looking at methods for absorbing these waves, dissipating them within insulating material before they ever make it into the vehicle interior.

Dr. Atalla's team is modeling this phenomenon with a combination of numerical and experimental methods. In particular, they rely on methods called Statistical Energy Analysis (SEA) and Finite Elements Analysis (FEA), which combine detailed models of car interiors with the results of advanced mechanical and acoustical tests on potential insulators. The Université de Sherbrooke is one of the few labs in North America with the capabilities to conduct these kinds of measurements.

Dr. Atalla and his colleagues have taken advantage of improvements in SEA and FEA software tools, refining their analytical techniques to produce more directly an equivalent to finite element results. There is no need to carry out most of this work on a physical prototype, which significantly reduces the time and expense associated with the process.

"You can now model the whole sound package for an entire car," he says, pointing the possibility of materials embedded with tiny actuators that respond to incoming sound by generating their own waves to nullify that sound.

Nevertheless, he adds, making such systems affordable is crucial to getting this technology onto the market. "We need to find ways of coming up with smart solutions that don't cost much to put into cars," he says. "Before you even start doing testing, you can work from the model to compare the price and performance of each package." ■

Familiar Faces Promote AUTO21

Researchers and HQP help illustrate the Network's leading-edge research

AUTO21 has introduced a new advertisement to help promote its innovative research. The ad features AUTO21 researchers and HQP in several streams of research: materials and manufacturing; health, safety and injury prevention; and alternative fuels.

The ad first appeared in a special supplement to the Globe and Mail in December 2003. The supplement focused on the Networks of Centres of Excellence of Canada program, and coincided with the NCE of Canada's annual general meeting. Several industry partners, including DaimlerChrysler Canada, Ford Motor Company of Canada, General Motors of Canada, Honda Canada, Toyota Canada and the University of Windsor supported the publication of the ad.

The ad will also appear in several trade publications this spring. ■