



RED RIVER  
COLLEGE

APPLIED RESEARCH &  
COMMERCIALIZATION

# 2011 | 2012 Year in Review



# Message from the Director



The applied research taking place at Canadian colleges continues to grow – not only in scope and quality, but in its contribution towards strengthening regional capacity to innovate and be more productive. Since its inception in 2004, Applied Research & Commercialization (AR&C) at Red River College (RRC) has served as one model for the adoption of applied research programs at colleges nationwide. In the past year, we have continued to evolve this model and expand our applied research portfolio.

Sustainable infrastructure continues to be a major focus. The Centre for Applied Research in Sustainable Infrastructure has served host to a number of cutting edge projects

in conjunction with the Sustainable Infrastructure Technology Research Group and funding from the Natural Sciences and Engineering Research Council of Canada. These projects include demonstration and testing of parabolic solar-trough technology, air-leakage testing of commercial buildings, energy-monitoring systems, greenhouse design and more.

Also emerging prominently is our research in sustainable transportation. The Advanced Transportation & Energy Centre has served a number of projects and now hosts the newly created Electric Vehicle Technology & Education Centre. Projects in this area include testing and demonstration of plug-in hybrid electric vehicles, an all-electric passenger vehicle and an all-electric transit bus.

To enhance awareness and connections among our industry network and within the College, we are continuing development and roll out of a number of programs including, the Sustainable Infrastructure and Transportation Cluster Map, the Inventory of College

Applied Research Expertise and our popular events and workshops series.

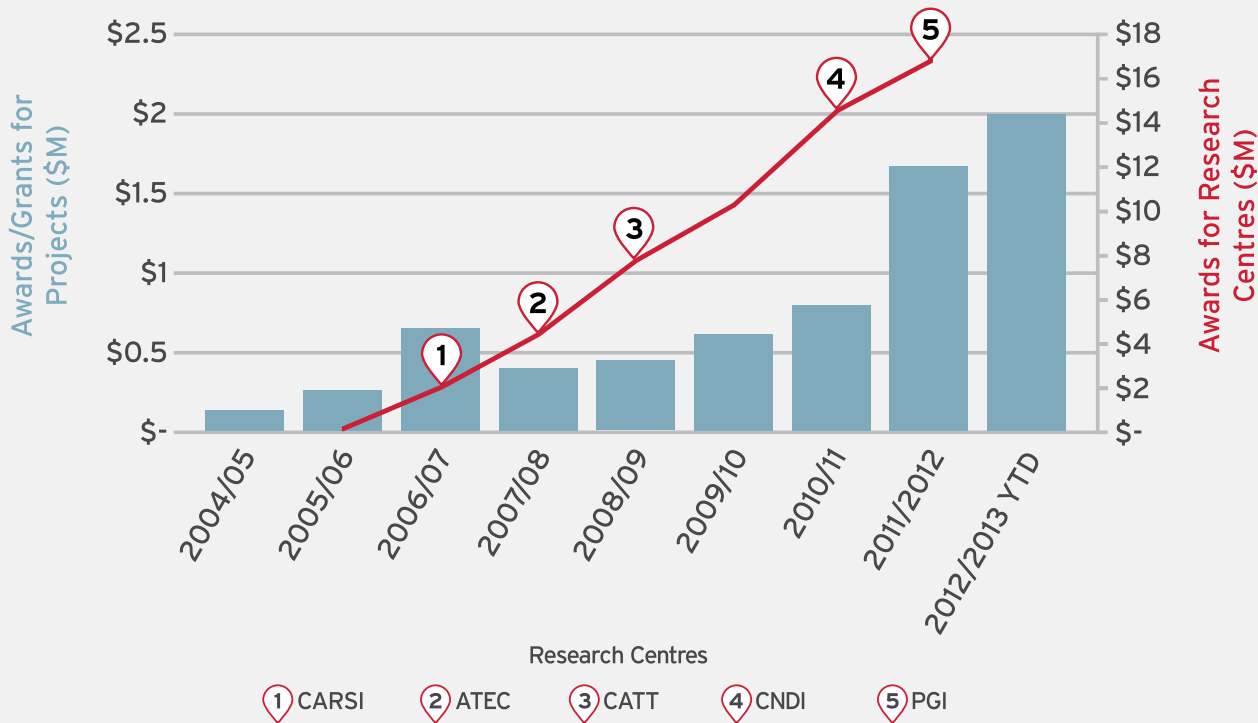
2012-2013 is sure to be another exciting year with new funding from the National Research Council Canada's Industrial Research Assistance Program to support small- to medium-sized enterprise productivity enhancement through digital technology adoption. Also in development is applied research in food technology at the Paterson GlobalFoods Institute and aerospace and advanced manufacturing research with the soon-to-be developed Advanced Aerospace Innovation Initiative.

We hope you enjoy this brief review of our past year. As always, please feel free to contact us with your applied research ideas, needs and opportunities.

Sincerely,

Ray Hoemsen, P. Eng.

## Applied Research Awards

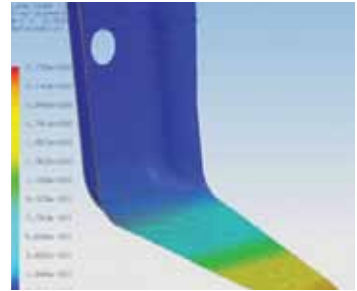


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## College Applied Research Development Fund



Internal research plays an important role in AR&C's activities. Since 2004, AR&C has awarded over \$400,000 to RRC staff, students and faculty for almost 60 projects through its College Applied Research Development Fund (CARD). The award helps develop and build internal research capacity within the College, while providing a platform for innovation for those who are eager to conduct practical research, but are in need of opportunities and resources.

In 2011, CARD awardees received a total of \$97,500, funding that will be used to carry out the short-term projects, prepare industry-focused applied research proposals and assist with materials and equipment. The projects drew on a wide range of RRC expertise and included research in applied business, bio-fuel and mobile application development.

For a complete list of awardees and project summaries, visit [rrc.ca/appliedresearch](http://rrc.ca/appliedresearch).

## ACCC Gold Leadership Excellence Award



In 2011, the Association of Canadian Community Colleges (ACCC) named AR&C Director Ray Hoensen, P. Eng., as its prestigious Gold Leadership Excellence Award winner.

The award recognizes an individual from a Canadian college who has made the greatest impact on his/her institution and, as a result, the communities it serves. Hoensen has been a leading advocate in driving the public policy change to recognize the strategic role played by Canadian colleges in Canada's research and innovation agenda. He has been the driving force behind the creation of four applied research centres and a key factor to RRC winning several government and industry awards that amount to several million dollars in funding for the College.

Hoensen accepted the award at the annual ACCC Conference on June 5, 2011 in Edmonton, Alberta. To view a video profile on Hoensen and the award, visit [YouTube.com/RedRiverCollege](http://YouTube.com/RedRiverCollege).

# Electric Vehicle Technology & Education Centre

Building off the momentum of research with Toyota Prius plug-in hybrids, 2011-2012 saw RRC/AR&C and key partners commit to electric vehicle initiatives in a big way. In 2011, RRC announced, along with the Province of Manitoba, Mitsubishi Heavy Industries, New Flyer Industries and Manitoba Hydro, the \$3 million, three-year All-Electric Bus - the first of its kind in Canada.

Arriving in grand style after a year in development, the All-Electric Bus made its debut outside the Manitoba Legislative Building on June 1, 2012. Partners were on hand to show off the bus, take attendees for a ride and explain the technology behind a transit vehicle with zero emissions and no tail pipes. The event marked the beginning of the next phase of the project, which includes on-road testing in Winnipeg over the next two years. RRC's contribution to the project is the development of a charging station for the bus, battery assembly and performance data analysis.

In addition to the All-Electric Bus, the Province of Manitoba also announced it would be investing in the establishment of the Electric Vehicle Technology & Education Centre (EVTEC) for all-electric and plug-in hybrid electric vehicles and technologies located within RRC's Advanced Transportation and Energy Centre (ATEC). ATEC wrapped up a three-year project in Fall 2011 that tested the effectiveness of an RRC-modified Toyota Prius plug-in hybrid in Manitoba's cold climate. A related one-year project involving cold-weather testing of an all-electric Mitsubishi iMIEV ended in Spring 2012. In the case of the Toyota Prius, researchers found that RRC's modifications were critical to improving the car's winter performance. AR&C will release the results of the Mitsubishi iMIEV tests later in 2012.



**EVTEC**  
ELECTRIC VEHICLE TECHNOLOGY & EDUCATION CENTRE

# Sustainable Infrastructure Technology Research Group

Since opening in 2004, sustainable infrastructure has been a key research area for Applied Research & Commercialization (AR&C), with most projects utilizing the Centre for Applied Research in Sustainable Infrastructure (CARSI). In 2011-2012, AR&C continued its efforts in this important field under the Natural Sciences and Engineering Research Council of Canada (NSERC)-funded Sustainable Infrastructure Technology Research Group (SITRG).

Standing boldly in the Notre Dame Campus, the parabolic solar-trough energy generator (pictured in background) was the centrepiece of this year's SITRG activities. Installed and operational in July 2012, the solar trough is testing the feasibility of using concentrated solar power in Manitoba's harsh climate. The project, which is involving RRC faculty and students, is the result of a partnership between the College, Manitoba Hydro, the University of Manitoba and NSERC. With the ability to produce heat in below-freezing temperatures, the solar trough has the potential to be a viable technology for Manitoba, especially for space-heating applications.

2011-2012 was also an important year for AR&C's work in improving energy efficiency in large buildings. In June 2012, it completed air-leakage testing on the 363 Broadway building in Winnipeg. The 15-storey, 191,000-square-foot office building had recently undergone a \$4-million facelift with the goals of increasing its energy efficiency and updating its appearance. With a lack of available data, SITRG sought to discover what impact the retrofit had on the building's air tightness - a factor that affects the building's energy use, comfort and structural integrity. To expand on this work, AR&C announced in July 2012 that it had received funding from Manitoba Hydro to perform air-leakage testing on 20 more commercial buildings throughout Manitoba.

In addition to its air-leakage testing, AR&C completed installation of an energy-monitoring system on the Cornerstone Life Lease Estates building in northeast Winnipeg. The milestone marked the beginning of a yearlong project that will assess the building's energy performance, in hopes of identifying areas to potentially reduce the building's operating costs and limit its environmental footprint. RRC's new greenhouse facility is also now home to research investigating thermal mass and the potential use of water for storing and releasing heat in greenhouses. This research aims to reduce energy consumption in cold climates such as Manitoba's.

AR&C also announced in 2011 that students could apply for and receive grants of up to \$5,000 to conduct research on improving energy performance in buildings through the NSERC SITRG Innovation Awards. The awards supported six student projects this year that will now serve as starting points to future research and networking opportunities within industry and RRC.







Improving Energy Efficiency in Large Buildings

Air Leakage Testing

363 Broadway



**SITRG**

Sustainable Infrastructure Technology Research Group



**NSERC  
CRSNG**

# National Research Council Canada Industrial Research Assistance Program



*NRC Industrial Research Assistance Program*    *Programme d'aide à la recherche industrielle du CNRC*

RRC has been a network member of the National Research Council Canada Industrial Research Assistance Program (NRC-IRAP) since 2008. Together, AR&C and NRC-IRAP have worked to support, enhance and expand the sustainable infrastructure and transportation cluster in Manitoba through its network-developing activities such as technology workshops, advising small- to medium-sized enterprises (SMEs) through Technology Advisory Support Services (TASS) and cluster map development. 2011-2012 saw this partnership grow with initiatives that served to support SMEs while building regional, national and international relationships.

On March 29, 2012, AR&C, NRC-IRAP, the Vehicle Technology Centre, and WESTEST hosted the Heavy Vehicle Technology Workshop at the Victoria Inn in Winnipeg. The workshop brought together over 60 delegates from across the Manitoba heavy vehicle industry, spanning the areas of vehicle equipment manufacturing and component supplies and services, with a focus on environmental sustainability. Local, national and international subject matter experts shared the latest in heavy vehicle technologies and business trends, while engaging attendees during valuable discussion and networking time.

## Manitoba's Heavy Vehicle Technology Workshop







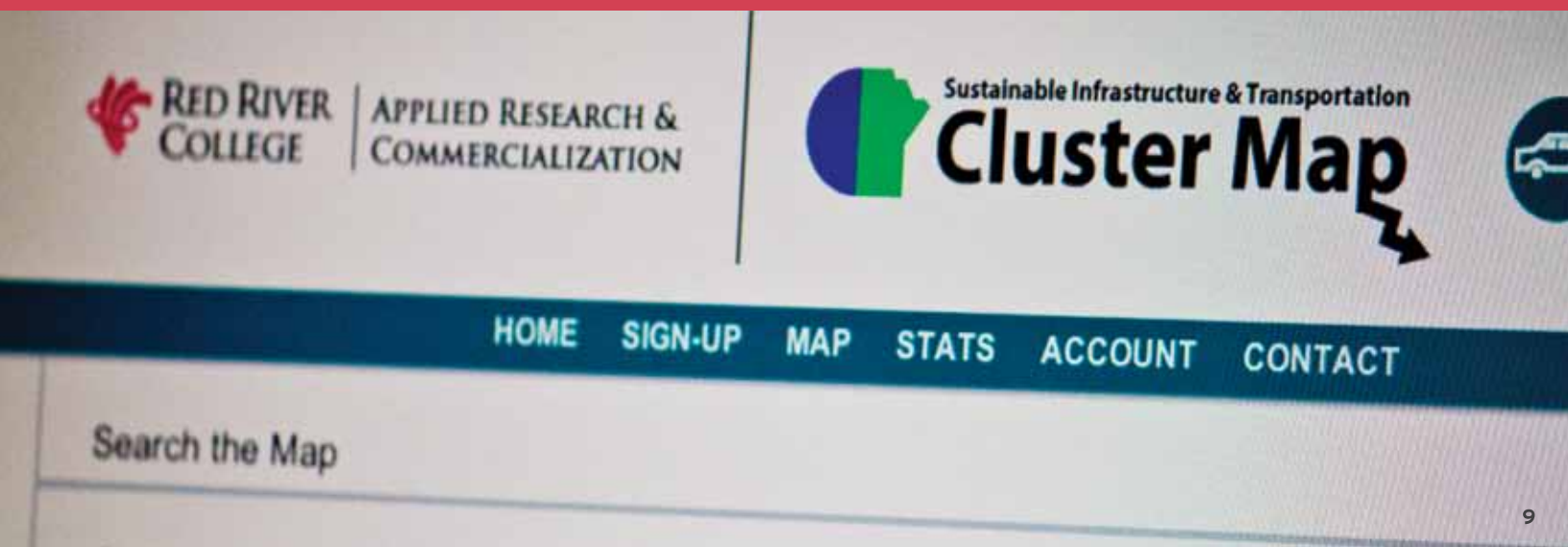
## Digital Technology Adoption Pilot Program

In 2012, RRC began its work with NRC-IRAP's Digital Technology Adoption Pilot Program (DTAPP). This project aims to provide Manitoba SMEs in the construction and manufacturing sectors with strategies towards implementing digital technologies that can help improve their productivity. AR&C, in consultation with industry, is researching technologies and disseminating results through four main activities in 2012-2013; these include: the creation of Technology Roadmap Search and Assessment reports and Digital Technology Strategy reports for the construction and manufacturing sectors; the provision of a digital technology speaker series and other events/workshops; the provision of digital technology advisory support services for individual SMEs; and industry outreach and linkage facilitation.

# Supporting SME Community Needs

## Sustainable Infrastructure & Transportation Cluster Map

As part of its efforts to grow the sustainable infrastructure cluster in Manitoba, AR&C, with support from NRC-IRAP and NSERC, developed the Manitoba Sustainable Infrastructure and Transportation Cluster Map, an online, interactive application that tracks organizations committed to sustainability across the province. The Cluster Map is online now at [mbsustainableclustermapping.ca](http://mbsustainableclustermapping.ca). Prospective organizations can sign up to take advantage of the map's benefits, including enhanced visibility and the ability to seek out potential partners.





Pictured above: Serge Broeska, Mechanical Research Technologist

## RRC Researcher and Instructor Develop New Tooling Method

In 2011 AR&C Mechanical Research Technologist Serge Broeska and Mechanical Engineering Technology instructor Leon Fainstein developed a new means of making dissolvable mandrels and patterns, otherwise known as rapid prototype composite tooling. Composite manufacturing has traditionally been done using metal moulds or plaster mandrels. These manufacturing methods require computer numerical control machines, which can be expensive and slow. Through the use of 3D printers, rapid prototype composite tooling offers a new, cheaper way to design and make composite parts using dissolvable mandrels and patterns. RRC has filed for patent protection and is now seeking a licensee to commercialize the invention.



Pictured above: Takaya Watanabe, General Manager, Mitsubishi Heavy Industries

## International Developments

2011-2012 saw AR&C continue to identify opportunities to collaborate towards leading edge, innovative projects with international partners. To enhance applied research and learning experiences for RRC students, faculty and staff, AR&C expanded research partnerships in Brazil, Uruguay and Japan. RRC signed memorandums of understanding with the Instituto Federal de Educação, Ciência e Tecnologia de São Paulo; the Pontifical Catholic University of Rio Grande do Sul; the Catholic University of Uruguay; and the Universidad ORT Uruguay. RRC also established research project and program partnerships with Japanese companies Neubrex and Mitsubishi Heavy Industries.

## Advanced Aerospace Innovation Initiative

The Natural Sciences and Engineering Research Council of Canada's (NSERC's) Technology Access Centre (TAC) program has awarded RRC \$1.7 million over five years to establish the Advanced Aerospace Innovation Initiative (A2I2). A2I2 will focus on making RRC's facilities, technologies and expertise available to SMEs in the transportation, aviation and manufacturing sectors. A2I2 will primarily provide services in technology diffusion and training; applied research assistance; technical services provision; and technology diffusion and training. Led by the School of Transportation, Aviation and Manufacturing, A2I2's services will be focused upon three central themes: advanced materials and bonding; imaging and automation; and vision systems and simulation.



**iCARE**   
inventory of college applied research expertise

## iCARE

The Inventory of College Applied Research Expertise (iCARE) is an innovative, online application that will serve as the ultimate resource for RRC stakeholders and potential industry partners seeking to identify applied research expertise among the faculty and staff at the College. It will play a key role in increasing RRC faculty participation in applied research. In addition to an overview of College facilities and capabilities, iCARE will share information about researcher interest, experience and expertise. This will enable RRC to quickly pinpoint the most appropriate research resource for a specific project.

## Research in Food Technology

Western Economic Diversification Canada (WD) announced in June 2012 that the federal government is investing \$2 million to expand research capabilities at the new Paterson GlobalFoods Institute at RRC's Exchange District Campus. By giving RRC access to advanced equipment for testing new food products and processes, this funding will develop the opportunities for students and faculty, while growing the Manitoba food industry. Adding another branch to its applied research activities, RRC will work with local organizations in the food sector, offering College facilities and expertise to help spark innovation and create business opportunities.



## Current & Future Developments





APPLIED RESEARCH &  
COMMERCIALIZATION

Advanced Design & Manufacturing | Clean Technology | Digital Technology | Health, Nutrition & Social Sciences

[Blogs.rrc.ca/ar](https://blogs.rrc.ca/ar)

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[www.rrc.ca/appliedresearch](https://www.rrc.ca/appliedresearch)

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