DALHOUSIE UNIVERSITY

OutFront

RESEARCH THAT MATTERS

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INNOVATIVE SOLUTIONS

DR. JOHN NEWHOOK ON FIBRE-REINFORCED POLYMER

Special Issue

Materials Research

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DALHOUSIE UNIVERSITY RESEARCH PROJECTS: KEY FUNDING RESOURCES

While Dalhousie University receives research funding from more than 500 agencies and private sector companies, it is also the recipient of substantial support from the public sector. Below are some of the key government groups that have provided funding:

AIF – ATLANTIC INNOVATION FUND, managed by the Atlantic Canada Opportunities Agency, is designed to strengthen Atlantic Canada's economy by accelerating the development of a knowledge-based industry. **www.acoa.ca/e/financial/aif/**

NSERC – NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA makes strategic investments in Canada's capability in science and technology. **www.nserc-crsng.gc.ca**

SSHRC – SOCIAL SCIENCES AND HUMANITIES RESEARCH COUNCIL OF CANADA promotes and supports university-based research and training in the social sciences and humanities. **www.sshrc-crsh.gc.ca**

CIHR – CANADIAN INSTITUTES OF HEALTH RESEARCH funds more than 8,500 researchers in universities, teaching hospitals and research institutes across Canada. **www.cihr-irsc.gc.ca**

CFI – CANADA FOUNDATION FOR INNOVATION provides 40 per cent of infrastructure costs for quality research projects; research institutions must then secure the remaining funds from other government sources and the private sector. **www.innovation.ca**

NSRIT – NOVA SCOTIA RESEARCH AND INNOVATION TRUST helps the province's researchers pursue projects with social and economic benefits in virtually any sector. The fund helps Nova Scotia's research institutions to secure grants from the Canada Foundation for Innovation. **www.gov.ns.ca/econ/**

CRC – CANADA RESEARCH CHAIRS invests $300 million a year to attract and retain some of the world's most accomplished and promising minds, in an effort to make Canada one of the world's top five countries for research and development. **www.chairs.gc.ca**

NSHRF – NOVA SCOTIA HEALTH RESEARCH FOUNDATION works with the health research community and other stakeholders to invest the province's health research resources in a manner that will best serve to improve the health of Nova Scotians. **www.nshrf.ca**

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Contact
OutFront Magazine
5248 Morris Street
Halifax, NS Canada
B3J 1B4

outfront@dal.ca
www.dal.ca

Executive Editor
Julia Watt, BPR MBA
e-mail: julia.watt@dal.ca

Content Review
Nancy Hayter
Amanda Pelham

Graphic Design
Ashley Janes
Fran Ornstein

Photography
Danny Abriel
Nick Pearce

Publisher
Research Services
Dalhousie University

Materials Research is directly related to economic performance. It has a profound impact on the quality of life, and it holds solutions to a more sustainable way of living.

Whether new materials are being developed because they are lighter, more energy efficient, less toxic or cheaper, their invention begins with a solid understanding of their fundamental properties. Innovative new applications in materials research are grounded in the basic sciences of physics, chemistry, engineering and physiology, among others. Dalhousie University's laboratories have produced and will continue to produce environmentally and commercially important new and useful materials.

The stories that follow capture but a few of our outstanding scientists. Their work is well reputed, relevant and, perhaps most importantly, conducted collaboratively across disciplinary divides. Enjoy discovering their great work as much as I have.

Martha Crago, PhD
Vice-President, Research
Dalhousie University

Institute for Research in Materials

Collaboration at its best

Today, materials research is being propelled to the forefront at many universities. Not surprising, since pretty much everything we see and use is made up of some type of material. New and improved materials have a significant role to play in stimulating innovation and product development.

Perhaps the most challenging part of this research area is that it can only advance if a university adopts an interdisciplinary approach to materials. The materials properties are such that they cannot be understood within the context of any one discipline.

Dalhousie buys into that philosophy wholeheartedly and it was this fundamental understanding that led to the creation of the Institute for Research in Materials (IRM) in 2002. Now over 100 members strong, it includes researchers from a variety of disciplines such as engineering, earth sciences, physics, chemistry, medicine, dentistry and architecture. The IRM enhances opportunities for researchers to collaborate on a range of materials research projects.

As our scientists and engineers work to understand materials so that new ones can be created, they are working at a nanometre level. And that requires sophisticated, and typically very expensive, equipment. The IRM has been successful in acquiring state-of-the-art materials research facilities for the university. Technical staff members are responsible for the most sophisticated pieces of equipment, maintaining the instruments, training users and providing services for academic, government and industrial clients and partners.

Material Characterization Equipment

- Cold-field Emission Scanning Electron Microscope (SEM)
- Focused Ion Beam (FIB)
- X-ray Photoelectron Spectrometer (XPS) and Secondary Ion Mass Spectrometer (SIMS)
- 700 MHz NMR Spectrometer
- Combinatorial Sputtering System
- High-speed Motion Recorder
- Ultrasonic Immersion Testing System (UITS)
- Grindosonic
- Scanning Thermal Microscope (SThM)
- Physical Property Measurement System (PPMS)
- Differential Scanning Calorimeter (DSC)
- Hot Press
- Electron Microprobe

Dr. Rich Dunlap, Director, IRM

DR. YANA FEDORTCHOUK CREDITS DALHOUSIE'S INSTITUTE FOR RESEARCH IN MATERIALS FOR PROVIDING IMPORTANT ACCESS TO MATERIALS SCIENCE-SPECIFIC RESEARCH METHODS AND SHARED EQUIPMENT.

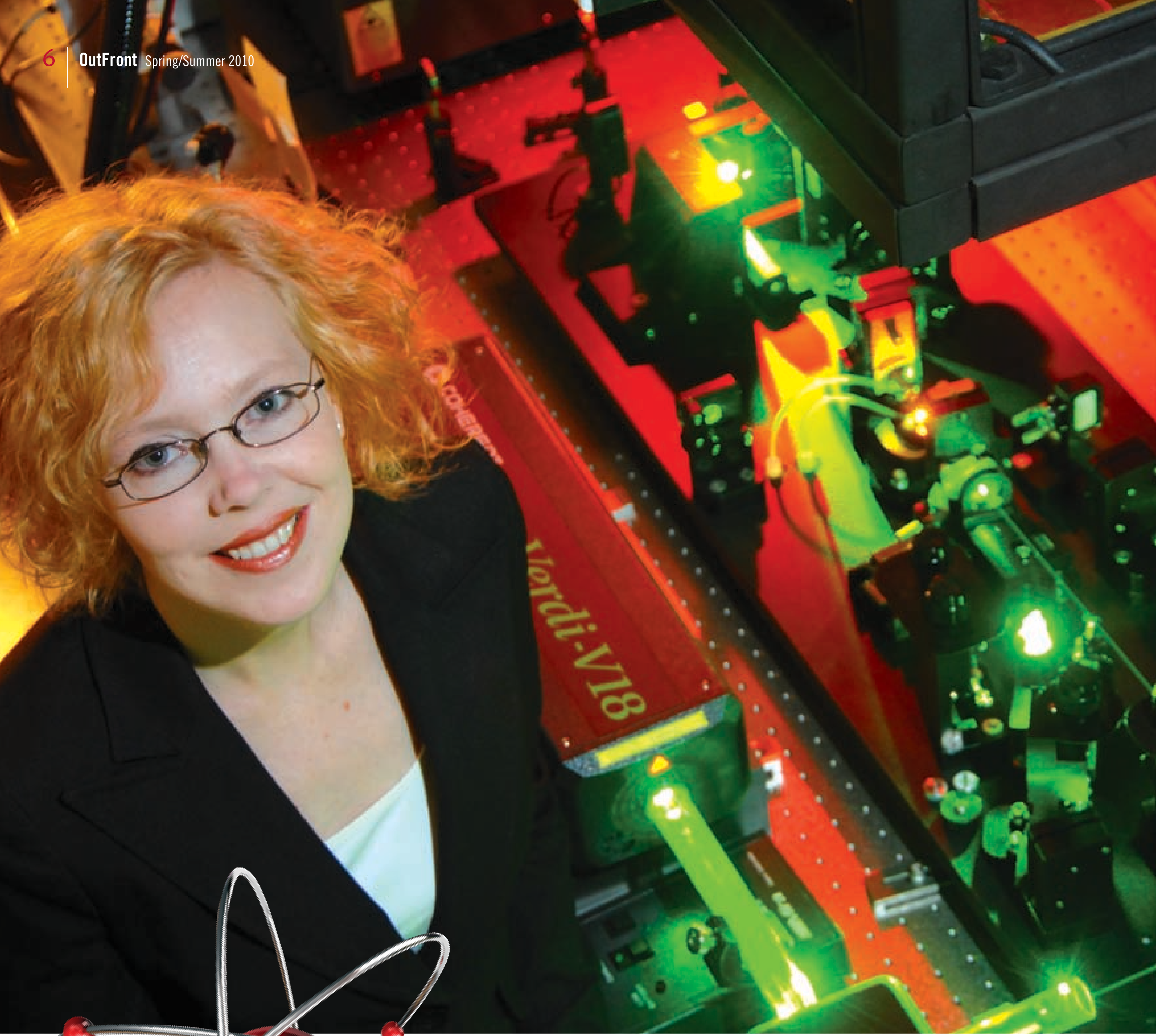
Magma P.I.

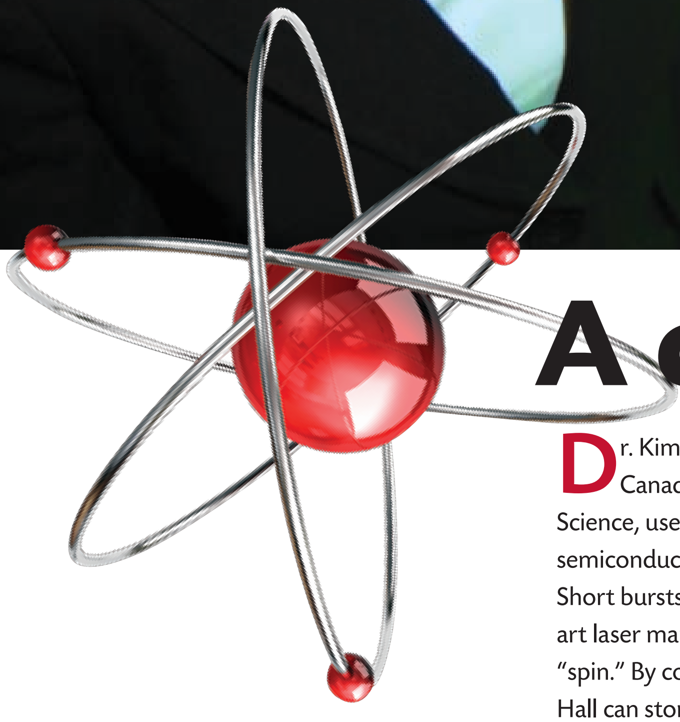
Diamonds may have high commercial value but they also hold secrets to the complex make-up of magmatic liquid that rests 200 kilometres beneath the earth's surface.

As the magma is forced upwards through the earth's mantle by a deep volcanic eruption, it forms a clay-like substance called kimberlite. This kimberlite serves as an elevator to billion-year old diamonds with extreme sensitivities to the magmatic fluid. Changes to a diamond's exterior caused by fluid exposure can provide great insight into the currently unknown processes in the earth's mantle.

In her lab, Dr. Yana Fedortchouk simulates various fluid variations, exacerbated by high temperature and high pressure, to try to replicate the corrosion or pits that show up on the diamond's surface. This new approach allows a look into the nature of the deep mantle fluids and helps us better understand how the entire earth system works. This is critical because many processes on earth today are linked to areas deep within its mantle.

Fedortchouk credits Dalhousie's Institute for Research in Materials for providing important access to materials science-specific research methods and shared equipment. "The sophisticated equipment is important when studying much defined material features," says Fedortchouk. "I also benefit from the perspectives of many different disciplines." ■



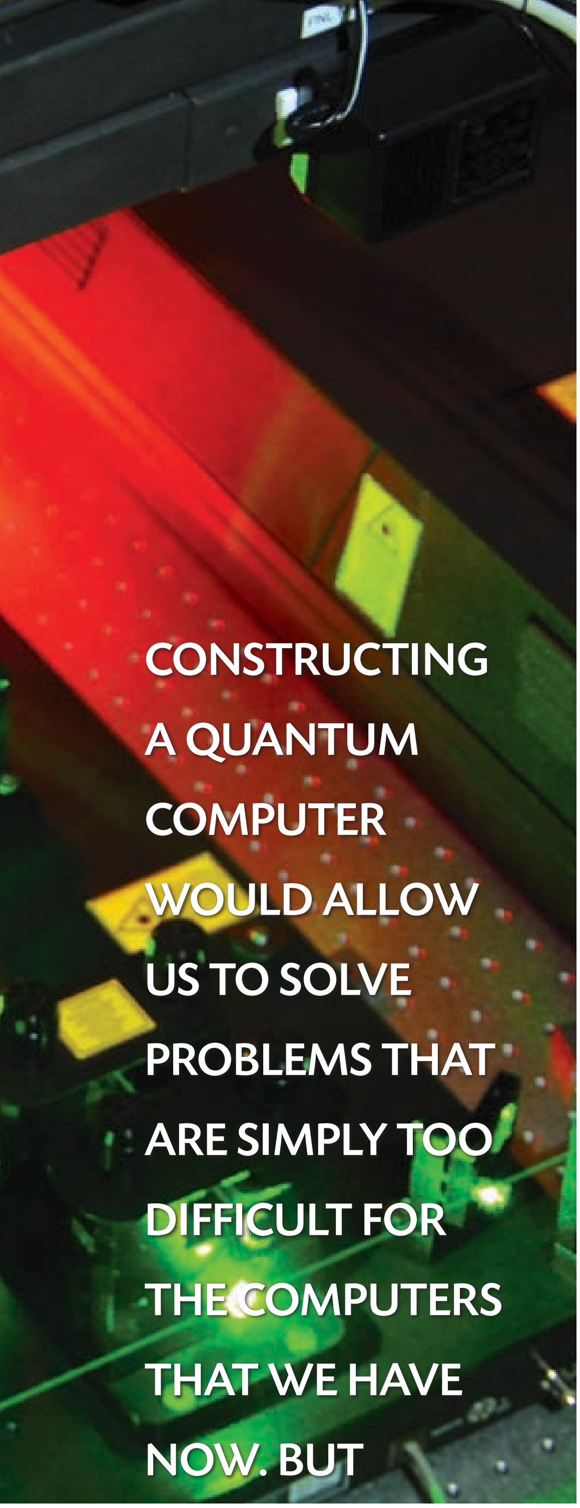


A quantum leap

Dr. Kimberley Hall, Dalhousie's Canada Research Chair in Ultrafast Science, uses nano-sized pieces of semiconductor material to trap electrons. Short bursts of light from a state-of-the-art laser manipulate a property known as "spin." By controlling this isolated spin, Hall can store information in the trapped electron. The research itself is complex and the data are challenging to generate.

The highly regarded physicist is working with different-sized light spurts that last about 100 femtoseconds. To put it in perspective, 100 femtoseconds are to a second what a centimetre is to the distance from the earth to the sun. And it's what happens within those 100 femtoseconds that she wants to study.

By harnessing electron spin, Hall is laying the groundwork needed to build a quantum computer. "It really represents a paradigm shift that would have broad implications in areas ranging from the interests of government, like encryption and security, to the business and financial sectors." ■



> CONSTRUCTING A QUANTUM COMPUTER WOULD ALLOW US TO SOLVE PROBLEMS THAT ARE SIMPLY TOO DIFFICULT FOR THE COMPUTERS THAT WE HAVE NOW. BUT TACKLING THIS BOLD SCIENTIFIC FRONTIER IS A BIT LIKE LOOKING FOR A GRAIN OF SAND IN THE PITCH DARK.

Cheaper conversion

Dr. Harm Rotermund is exploring new control mechanisms for non-linear systems exhibiting chaotic dynamics. A slight change in a parameter could drastically change the systematic outcome, even if it is dependent on many variables.

These controls can be applied to such diverse areas as tachycardia heart attacks, population growth, the stock market and one of the areas Dalhousie's Rotermund is investigating – automobile catalytic converters.

Inside a car's catalytic converter are minute platinum particles where deadly carbon monoxide reacts with oxygen to create carbon dioxide. The CO_2 is released through the car's exhaust system. In most cases, the catalysts used to incite these changes are expensive precious metals (a pound of platinum costs a whopping $26,400).

This process can be simulated through equations describing the chemical reaction rates on the surface. By studying the pattern formation and the changes that occur (sometimes with only the slightest of modification of initial conditions) predictive models can be developed, leading to steady behaviour of the systems. The CO-oxidation on platinum serves as a model for non-linear dynamics in general. ■

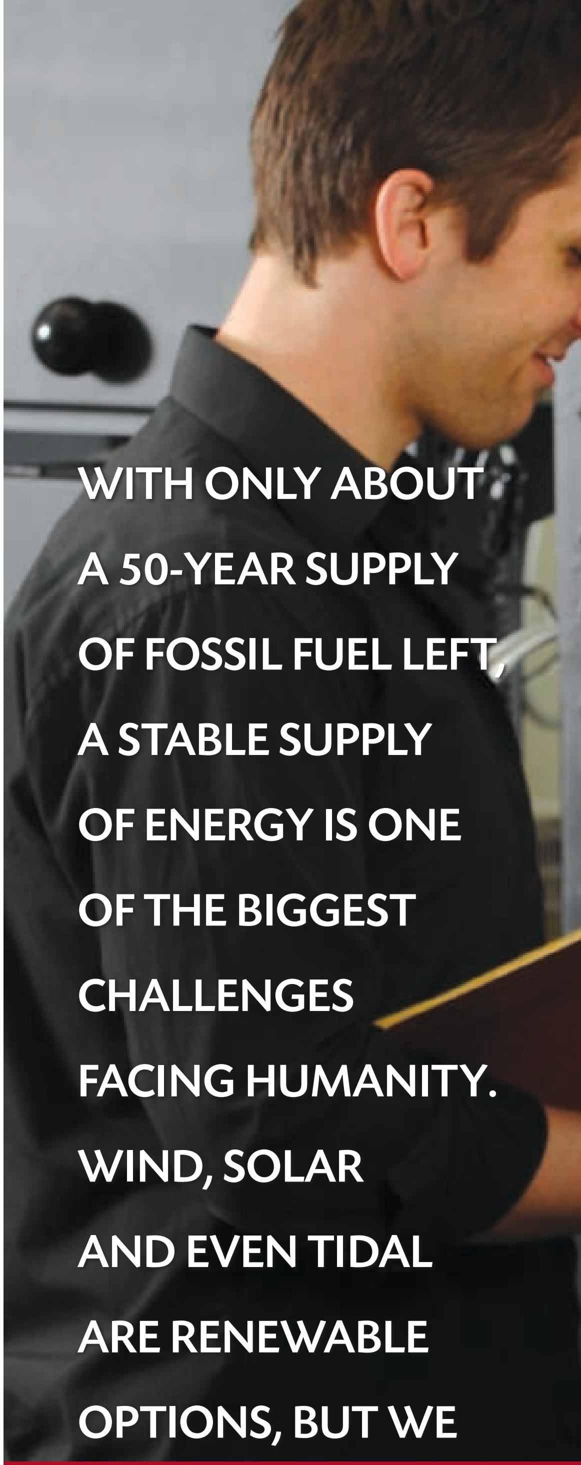
Flexing his solar muscles

Dalhousie's Dr. Ian Hill is working toward what he calls the "Holy Grail" of large area electronic devices – a solar cell that can be produced using a continuous "roll-to-roll" technique instead of the current, less efficient and significantly more expensive "batch manufacturing" technique.

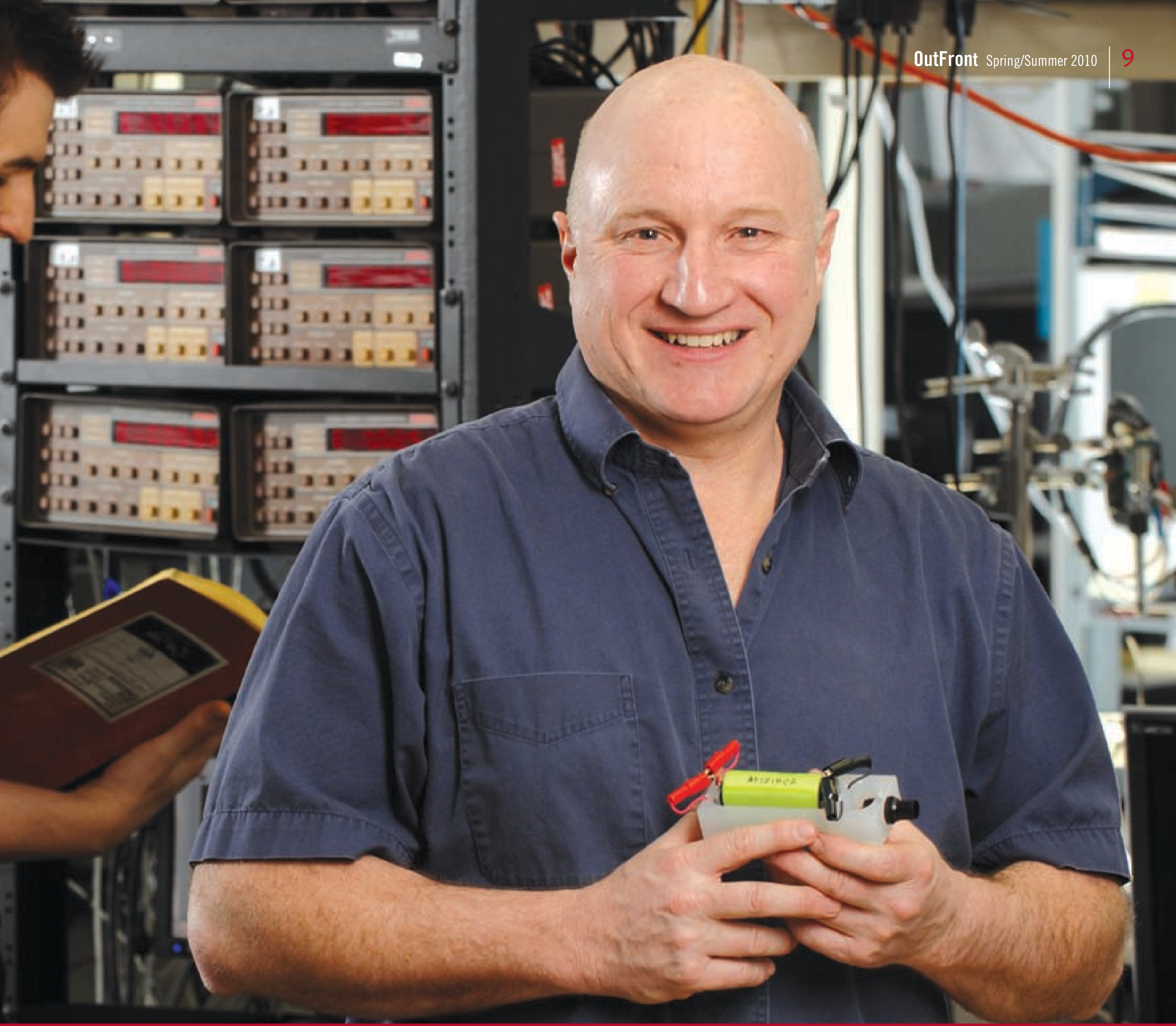
Getting there means replacing widely used silicon based material with organic (carbon-based) molecules. The advantage – new material combinations with broader properties such as flexibility (think folding your TV) and optimized efficiency.

"This is cutting edge materials science that has the potential to revolutionize the next generation of flat-panel display screens," says Hill. "Even though LCDs have become the panels of choice – whether for computer screens or a mobile phone – they could soon be trumped by the more sustainable and cheaper OLEDs (Organic Light Emitting Diodes).

Hill recently won a Dalhousie Innovation Award for his work in developing alternative materials for display screens. He was also awarded infrastructure funding through the Canada Foundation for Innovation's Leading Edge Fund. ■



WITH ONLY ABOUT A 50-YEAR SUPPLY OF FOSSIL FUEL LEFT, A STABLE SUPPLY OF ENERGY IS ONE OF THE BIGGEST CHALLENGES FACING HUMANITY. WIND, SOLAR AND EVEN TIDAL ARE RENEWABLE OPTIONS, BUT WE NEED TO FIGURE OUT HOW TO EFFECTIVELY STORE THIS ENERGY TO ENSURE A CONSTANT SUPPLY.



Supercharged science

Dr. Jeffery Dahn, one of the pioneers of the lithium battery, spends most days developing and testing new materials and exploring storage challenges. In fact, fundamental research in Dahn's lab has led to a new material (called NMC) that is being used in rechargeable batteries. About 6,000 metric tons of the material goes into 500 million Li-ion batteries per year and this number is increasing.

The ability to conduct many simultaneous tests gives Dahn's lab an edge – most other labs in the world can only test one new material composition at a time. "We've adopted combinatorial and high throughout methods using our two 'multi-target sputtering machines', which allow us to test over 60 material compositions at the same time under the exact same conditions. Our results are accurate and conclusive," says Dahn, Dalhousie's Canada Research Chair in Battery and Fuel Cell Materials.

Dahn collaborates regularly with the private sector in furthering his research. His relationship with 3M spans 15 years. Mike Irwin, Technical Director, 3M Canada Company feels the connection between 3M and Dalhousie is a model for university interactions. "Jeff and his team have made significant contributions to 3M's intellectual property portfolio in the area of Li-ion batteries," says Irwin. "Materials developed in Jeff's labs either are or are in the process of being commercialized."

Dahn and 3M continue to look for better and more efficient ways to harness energy. ■

IT'S HARD TO BELIEVE SOMETHING AS THIN AS FILM COULD BE FIVE TIMES STRONGER THAN STEEL AND ABLE TO WITHSTAND CANADIAN WINTERS AND THE USE OF DE-ICING SALT. BUT IT IS AND IT CAN. THIS MAKES FIBRE-REINFORCED POLYMER AN ATTRACTIVE POSSIBILITY FOR THE CONSTRUCTION INDUSTRY.

Innovative solutions

Fibre-reinforced polymer – the same material used in golf clubs and snowboards – has replaced steel in several bridges and other infrastructure across the country. “With our climate, corrosion presents a huge maintenance issue,” explains Dalhousie’s Dr. John Newhook. “Building bridge decks and other structures without steel reinforcement solves this problem.”

Newhook’s research focuses on developing innovative materials and structural monitoring technologies. He was one of the engineers behind the world’s first highway bridge deck with no steel reinforcement, the 31-metre-long Salmon River Bridge on the Trans-Canada Highway 104, near Kemptown, Nova Scotia.

Currently Newhook’s team from the Centre for Innovation and Infrastructure at Dalhousie has partnered with Remote Access Technology (RAT) to install a structural monitoring system on the A. Murray MacKay Bridge in Halifax. The system, located on key elements of stiffening trusses, will provide Halifax Harbour Bridges with crucial information about long term maintenance needed to ensure continued safe travel.

For Newhook, success comes in being solution-oriented. “Whether it’s a bridge or another piece of infrastructure, you must understand the way it behaves and handles the stresses put on it,” he says. “Then you need to turn the problems into innovations that make the system smarter and more efficient.”

The power of powder

DALHOUSIE'S POWDER METALLURGY TEAM HAS BEEN INVOLVED IN SEVERAL PROJECTS WITH GKN SINTER METALS, A GLOBAL LEADER IN MANY POWDER METALLURGY TECHNOLOGIES. "THE COLLABORATION HAS BEEN OF CONSIDERABLE BENEFIT AND VALUE TO OUR COMPANY," SAYS IAN DONALDSON, GKN'S DIRECTOR R&D NORTH AMERICA AND MATERIALS ENGINEERING. "WE PLAN ON EXPANDING INTO OTHER AREAS OF MATERIALS RESEARCH WITH THE DALHOUSIE GROUP."

Research in powder metallurgy alloys and processing strategies has helped overcome the Achilles' heel of diecasting – waste and excess machining. Dalhousie is emerging as a metallurgical powerhouse and is home to one of Canada's best research facilities.

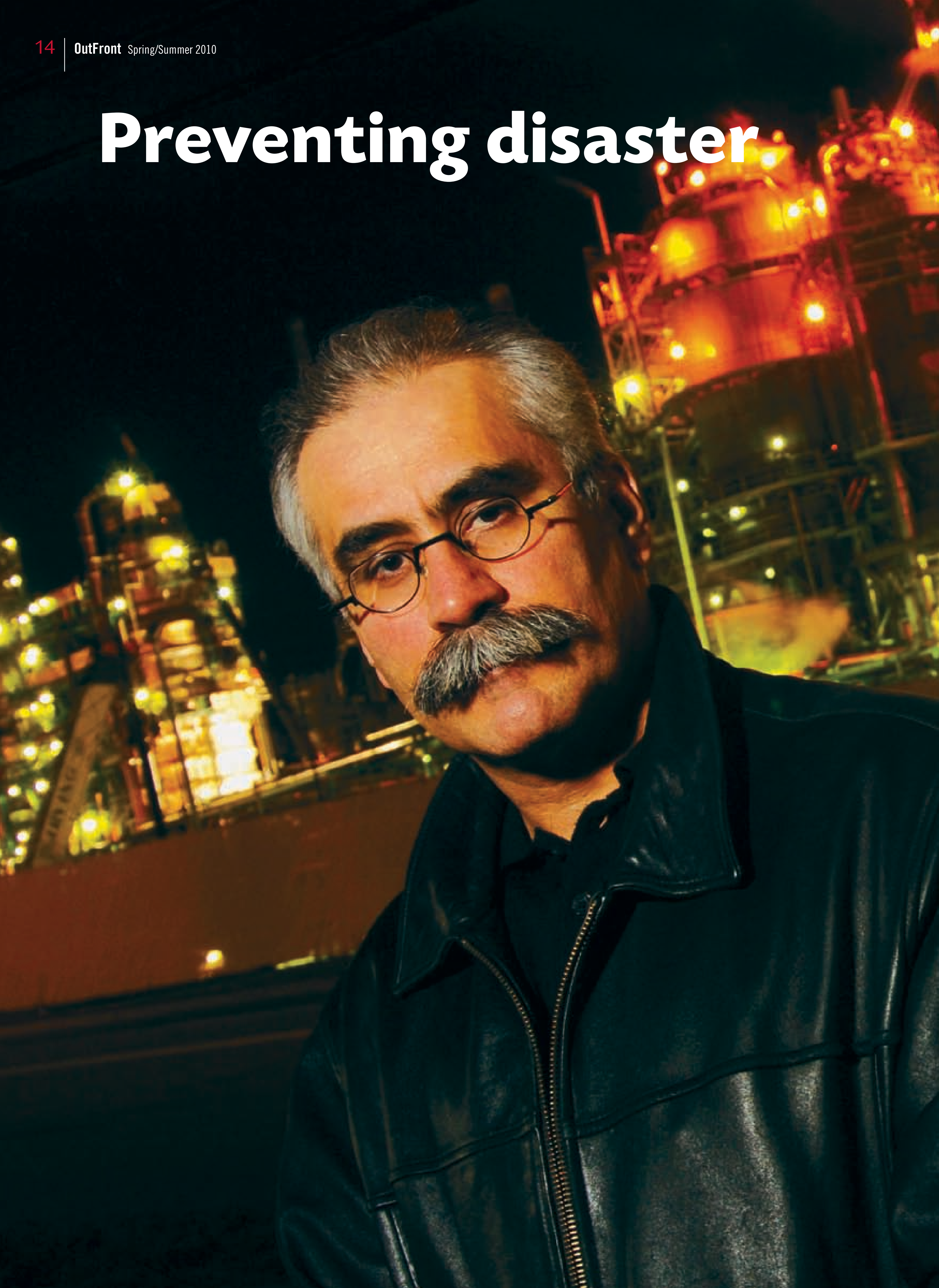
For years, industry has relied on diecasting to engineer metallic materials into components of the desired shape and mechanical performance. However, over the last decade a more efficient process has surfaced. Known as "powder metallurgy," it involves taking metallic powder and pressing it directly into the desired shape of the finished product. The resulting products are near-net-shaped, geometrically complex, and have excellent mechanical performance.

Dr. Paul Bishop leads Dalhousie's particulate materials centre, where many light weight materials are being studied. Dr. Kevin Plucknett, Canada Research Chair in Degradation and Failure of Advanced Materials, works with titanium which holds great promise for biomedical applications. Drs. Georges Kipouros and William Caley work with magnesium and nickel-based alloys respectively, both very important to the aerospace and automotive industries. They are soon to be joined by Dr. Stephen Corbin (coming to Dalhousie from the University of Waterloo) whose primary research is with nickel-titanium alloys and copper-based solders.

While part of their work emphasizes advanced understanding of existing commercial alloys, developing new, stronger compositions with improved wear resistance figure prominently in their research. At any given time in the lab there are several alloys such as aluminum silicon, aluminum nickel or titanium tin undergoing aggressive pressure and temperature testing to determine their ability to maintain their properties under such stressful circumstances. ■

From left Drs. Plucknett, Bishop, Kipouros and Caley.

Preventing disaster



RELENTLESS DRILLING AND CONTINUOUS OCEAN CURRENTS CAUSE OIL RIGS TO BECOME FATIGUED. A LEAK AT A NUCLEAR PLANT RESULTING FROM WEAKNESS IN A PIPE JOINT CAN BE CATASTROPHIC. IF PREVENTATIVE MAINTENANCE ISN'T WELL PLANNED, THE RESULT CAN BE COSTLY, EVEN DEADLY.

Dr. Farid Taheri can take the guesswork out of preventative maintenance by accurately predicting the expected life span of some very important materials.

Taheri has developed a novel vibration-based damage detection procedure that determines the "damage energy index". The technique has proven to be extremely robust for detecting damage, especially for structural health monitoring of joints in pipelines, and is less expensive than the standard methods.

"I can either recreate the working scenario and accurately determine whether failure threatens a pipe or a riser by computational simulations or capture the vibration response of the structure experimentally, and then assess the structure's health," says Taheri, a civil engineering professor at Dalhousie. "With this information, you can pinpoint the best time to replace equipment pieces, avoiding costly shutdowns and workplace accidents."

For industry, this is an exceptionally important service. Instead of dealing with equipment failure, managers can make informed decisions about preventative maintenance or repairs. ■

HIGH FUEL PRICES AND AN INCREASED INTEREST IN PROTECTING THE ENVIRONMENT HAVE MEANT THE DEVELOPMENT OF HYBRID CARS. TEN YEARS FROM NOW, THE CAR'S ENGINE COULD LOOK DIFFERENT STILL. AND IT'S QUITE POSSIBLE THAT DALHOUSIE'S DR. HEATHER ANDREAS WILL HAVE PLAYED A PART IN THIS TRANSFORMATION.

A Complex Charge

Dr. Heather Andreas and her research team are studying the potential of supercapacitors. They store energy and won't wear out or fail to recharge after a period of use and the process to make the material is deemed environmentally friendly.

However, capacitors have a flaw to be fixed before they will start showing up under vehicle hoods. "They don't hold their charge for very long," explains Andreas. "Even just sitting on the shelf fully charged, they go dead after about seven days." This challenge forms the basis of her research. "Once we determine the 'why,' we can start to develop a solution."

Andreas says enhanced public knowledge and the growing support for sustainable systems are good news for her type of research. "Heightened interest in an issue usually means more research capacity and support. And certainly with unstable gas prices and fears of an oil shortage in the future, this issue is getting a lot of attention." ■

Lead-free glass

The European Union has legislated a lead-free glass policy which is proving challenging for big glass-producing companies. But while glass containing lead presents huge environmental challenges (it can't be recycled), it's what ensures a clear, consistent picture in many electronics.

Dr. Josef Zwanziger, Dalhousie's Canada Research Chair in Nuclear Magnetic Resonance Studies of Materials, is working on a solution to the EU's lead law. His research team has spent several years studying the properties of glass and investigating options for a lead-free product.

"One of the most attractive properties of glass is that it is not birefringent, meaning that light goes through it at the same speed at any angle," says Zwanziger. "If you add lead to the glass, this isotropic property is maintained even when the glass is subjected to random stresses and temperatures, making leaded glass strong, consistent and dependable."

He has successfully created a "recipe" for combining materials that will generate glasses comparable to the lead used today, providing the proper bonding and intended impact on the glass.

This recipe is protected under a provisional patent through Dalhousie's Industry Liaison and Innovation office. While this recipe will control birefringency, the new glass won't be ready for market until other outstanding issues are tested, such as durability, moisture resistance, index of refraction and transparency. But it's clear Zwanziger is on the path to usable lead-free glass. ■

Waste not

About 70 per cent of energy from a car's gasoline goes out the tailpipe as waste. What if it was instead rerouted to the vehicle's power train? This wasted heat would become a valued commodity – one that efficiently powers a vehicle while drastically reducing waste heat to the environment.

Dalhousie's Dr. Mary Anne White considers these possibilities almost every day. A professor in Chemistry and Physics, she is well versed in thermodynamics. She and her team study the physical properties of materials at their atomic and molecular level and how they respond to temperature changes.

To convert the wasted heat of a car's mechanical system into green energy requires a material that conducts electricity well and heat poorly. This is difficult to achieve because usually materials that conduct electricity well also conduct heat well, but one of White's main contributions to this field is the development of novel mechanisms to reduce heat conduction.

Take for example a "phase-change" material whereby a material stores heat when in solid form and then releases it when converted to liquid. This conversion from solid to liquid poses a problem when trying to develop a sound process for solar heat. White and her team developed a new class of chemicals that absorb heat very efficiently, and in contrast to other phase-change heat storage materials, these "new" chemicals stay in solid form during the storage/release activity.

White works with all types of materials to investigate the relationship between structure and thermal properties – from sea shells and ivory to semiconductor clathrates and carbon nanotube composites. "It's my goal to advance understanding of how materials respond to temperature changes, from colour changes to energy storage. This fundamental knowledge can be the basis for innovative and sustainable applications," says White. ■

COLLAGEN IS THE MOST COMMON PROTEIN IN THE BODY. IT DETERMINES THE STRENGTH AND STIFFNESS OF ALL OUR PARTS, FROM BONE TO MUSCLE TO SKIN. BUT THE MOLECULAR COMPLEXITY OF COLLAGEN MAKES DAMAGE IN "SOFT TISSUE INJURIES" DIFFICULT TO BOTH UNDERSTAND AND TREAT.

Tackling complex molecules

While health professionals tend to consider soft tissue injuries from an inflammation viewpoint, Dr. Michael Lee, the founder of Dalhousie's School of Biomedical Engineering, is investigating collagen's role in physiology. Using the materials science toolkit for studying polymer stability, he is looking at how tissue injuries cause damage deep within collagen's complex molecular structure.

Lee says such molecular damage could be a signal for the body to initiate repair, but the mechanism isn't yet clear. Adding to the collagen's inherent complexity is the aging process. Over time, the molecular packing changes, reducing the stability of collagen's triple helix structure. So as we age, both damage and subsequent repairs happen differently.

Collagen can also suffer "fatigue damage." Consider the human heart. Its four valves open and close 35 million times every year. They never stop, meaning that they have to repair themselves on

the fly. Lee's lab group has shown that each valve responds to its local fatigue loading by turning over its collagen in a uniquely responsive manner, making the valves truly "smart" structures.

Fully understanding the connection between tissue function and molecular structure is of great significance when developing repairs for debilitating injuries. Lee is one of only a very few researchers studying collagen from this materials engineering perspective. ■

A Better Way to Operate

A femur, or long bone injury, can be life-threatening if not dealt with quickly. Such an injury is often sustained during a car accident or heavy fall and is usually one of many ailments. If not treated, displaced fat and marrow can cause a life-threatening fat embolism in the lungs.

To realiagn or "reduce" the fracture, surgeons operate remotely from the top of the femur, placing a nail in the bone canal and inserting screws across the nail to keep it in place. If the fracture can't be properly aligned, the nail cannot be inserted. Surgeons must then open the femur to align the bone, but this more invasive procedure is viewed as a last resort.

Dr. Michael Dunbar thought of a device that could be used to reduce difficult fractures that can't be aligned without cutting the femur. He and medical student Dave Wilson enlisted four senior engineering students to develop the Femoral Fracture Reduction Device, an innovative tool that has the potential to eliminate the need to open a patient's femur during femoral fracture surgeries.

"It won't be needed for all cases, but when it is, it will reduce OR time, be less invasive, reduce blood loss and morbidity and improve healing - that's the promise of it," explains Dunbar, orthopedic surgeon and professor in Dalhousie's department of surgery.

Dunbar recently won a Dalhousie Innovation Award for his work in life sciences. ■


DR. R. PRICE

DR. RICHARD PRICE AND CHRISTOPHER FELIX HAVE DEVELOPED A DEVICE THAT WILL HELP DENTISTS PROPERLY CURE "WHITE" FILLINGS. BLUELIGHT ANALYTIC INC. WILL COMMERCIALIZE THE TECHNOLOGY.

The perfect cure

Tooth coloured fillings have become the material of choice for many patients and dentists. These "white" fillings contain resin that is hardened using a dental curing light; however, different curing lights deliver different types and amounts of energy. Recent studies suggest many white fillings are undercured, meaning they don't achieve the manufacturer's intended results. This is supported by studies showing that white fillings last, on average, only one third as long as silver amalgam fillings, when evidence indicates that they could have a similar lifespan.

Dentists cannot simply increase curing times to ensure the resin is fully hardened. "If the light exposure is too long, both the tooth and the gums can overheat. If it's too short, the resin doesn't cure and harden enough," explains Dr. Richard Price of Dalhousie's Faculty of Dentistry.

The exposure time depends on several variables – the curing light design, operator technique, restoration location and resin type. Currently there is no practical way for dentists to manage these four variables in the clinic.

Dr. Price and his assistant, Christopher Felix, developed MARC (Measurement of Accuracy when Resin Curing) to take the guesswork out of the proper curing time. A simulated patient complete with teeth, tongue, cheeks and lips is combined with research equipment and custom designed software to accurately measure the energy delivered to a simulated filling. MARC helps determine the optimal length of time required to properly cure the resin filling using any curing light.

Students and practicing dental professionals at Dalhousie's School of Dentistry are already being trained using MARC. Through Dalhousie's Industry Liaison and Innovation office, MARC has been licensed to a Halifax company, BlueLight analytics inc. Colin Deacon, BlueLight's President & CEO, says the new technology will be welcomed by practicing dentists. "Dentists care deeply about the health of their patients and unexplained failures can be frustrating. MARC will alleviate the need to estimate and lead to better long term results." ■

Capturing the sun's clout

Combining pre-historic weaving with modern technology has great potential for private sector innovation and improving the quality of our built environment. Dalhousie's Dr. Sarah Bonnemaison has teamed up with accomplished weaver from the Nova Scotia College of Art and Design, Robin Muller, to develop prototypes for electronic textiles.

Their first prototype has the potential to become a sustainable energy source. Think solar-powered curtains. By integrating electroluminescent wire and other circuitry into pockets of woven fabric, it is possible to develop a product that absorbs light during the day and emits a glow when the sun sets reducing the amount of light bulb energy needed in the evening hours.

"These intelligent textiles could add another (green) dimension to stage sets, interior design, or free-standing walls," says Bonnemaison. "In filling the gap between traditional textile manufacturing and new technologies, we can provide opportunities for product commercialization." ■

Partnerships that matter

Kevin Dunn, A/Executive Director, Dalhousie's Industry Liaison and Innovation office says that Dalhousie's materials researchers play a significant role in helping small enterprises reach success with their innovations. From better curling brooms to privacy fences made from very light material, our researchers have helped entrepreneurs overcome historical hurdles. There has been a huge increase in industry-researcher collaborations at the university in recent years, and we see that trend continuing. It is an exciting time at the ILI office.

@lab @ Dalhousie

Over the past decade, the field of electronic textiles has undergone a boon worldwide. Researchers are working to integrate new materials, fibres and fabrics with electronics to create textiles that can adapt and transform themselves. While these "smart" materials have a place in the fashion and advertising industry, they also have larger-scale applications architecturally and have the potential to contribute alternative energy or more efficient, effective design.

The ArchiTextile Lab (@lab for short) is Dalhousie's centre for the design of electronic textiles for architectural applications. The lab brings together specialists from electrical, computer and mechanical engineering, architecture, textiles, and jewelry that collaborate to develop prototypes for innovations in heat, moisture and pressure-sensitive fabrics that emit light or contract in response to electric current and conductive fabrics.

The @lab is supported by the Atlantic Innovation Fund and other granting agencies. ■

Chair in Sustainable Materials Research

With a strong presence in materials and with an increased university-wide focus on sustainability, Dalhousie is working to establish an endowment to support a Chair in Sustainable Materials Research. The new chair will link Dalhousie expertise to the community with a view to developing "greener" approaches for this region's manufacturing sector.

DALHOUSIE UNIVERSITY
Inspiring Minds

OutFront Magazine
5248 Morris Street
Dalhousie University
Halifax NS B3J 1B4
Canada

www/dal.ca