

COOL COMPANIES

SPECIAL REPORT

Alberta's Nanotechnology

and **Advanced Materials**

100's of opportunities
to grow your business

Canada's
Alberta-based

Nanotechnology Advanced Materials

By Claudia Sammer and Donald Rumball

Neurosilicon

Revolutionary tool promises new insights to treating neurological diseases

Neurosilicon is developing a lab-on-a-chip device (pictured at right) that is sensitive enough to monitor and track how neurons in the brain interact. This could help to improve our understanding of many neurological diseases and enable the development of new treatments for brain disorders. The target market for Neurosilicon's products is the research community.

COMPANY: Neurosilicon Corporation, www.neurosilicon.com, 5 employees, founded 2005, University of Calgary spinoff, boot-strapped and angel-funded, product launch summer 2008, (no office address yet), Calgary, Alberta, 646.943.2169

PRODUCT: Device to track how neurons interact

GROWTH STRATEGIES: Seek marketing and distribution partners in Canada and around the world

CONTACT: Veer Gidwaney, Director and co-Founder, veer@neurosilicon.com, 646.943.2169

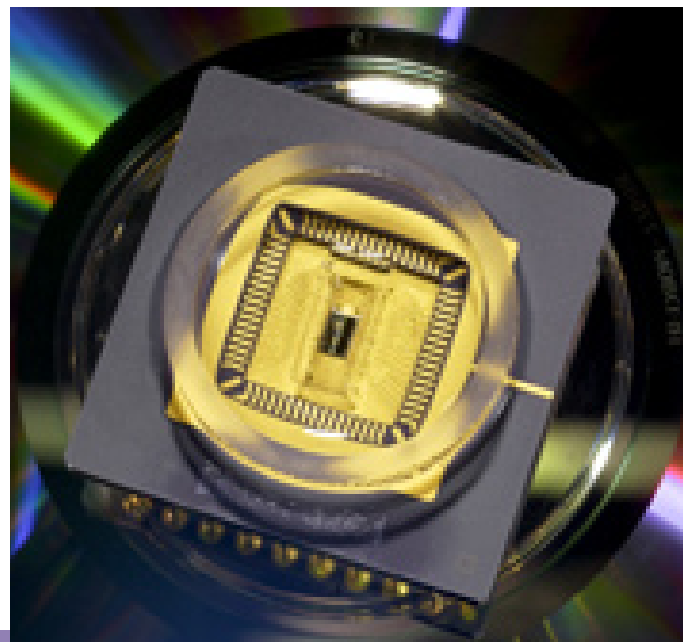


Photo credit: Neurosilicon Corporation

and als Companies

2008

Alberta is Canada's fastest growing nanotechnology and advanced materials cluster and home to some world-class innovator leaders in this space. As of May 2008 the cluster was 42 companies strong: 31 are active Alberta-based companies (profiles start p.10), 6 have corporate R&D programs in Alberta (p.34), and another 5 are not yet ready for publicity. Of the 37 companies profiled in this article, 20 are nano-based (54%), 13 are MEMS-based (p.6) and 4 have a composite or ceramic technology (p.8).

VisibleDust

World's #1 digital sensor cleaning products as rated by professional photographers

Digital DSLR cameras have completely replaced film cameras. Sometimes the image capturing sensors in digital cameras get dirty with a piece of dust and this dust starts to appear on photos. Since digital camera sensors are very delicate, they are easily damaged and their replacement can be as much as a new camera. To address this challenge, VisibleDust has created a line of products based on nanotechnology. One example is a special brush coated with permanently charged nanoparticles that attracts dust (pictured).

COMPANY: VisibleDust Inc., www.visibledust.com, 10 employees, founded 2004, revenue-funded, products sold worldwide, Suite 200, 56 Lincoln Park, Canmore, Alberta T1W 3E9, 403.678.6522

PRODUCT: Full range of products for cleaning sensors in digital cameras

GROWTH STRATEGIES: Seek research scientists

CONTACT: Dr. Fariborz Degan, CEO and Founder, tech@visibledust.com, 403.678.6522



Photo credit: Emin Ozkan

Photo credit: VisibleDust Inc.

Exciton Technologies

Silver-based infection control technology

Exciton has created a platform technology that leverages the anti-microbial properties of silver in preventing infection. This patented technology incorporates chemical methods for deposition of silver compounds on any surface to suppress growth of micro-organisms. These silver compounds can be used for coating wound dressings to prevent an infection and provide healing. In addition, these silver compounds can be applied to medical devices such as urinary catheters, stitches, and implants. Another targeted application is disinfection of all non-porous surfaces coating surgical masks and garments to kill pathogens and to prevent the spread of disease.

COMPANY: Exciton Technologies Inc., www.excitontech.com, 5 employees, founded 2001, launch of first product, angel-funded, 4000 Enterprise Square, 10230 Jasper Ave, Edmonton, Alberta T5J 4P6, 780.248.5868

PRODUCT: Infection control and disinfectant products based on the antimicrobial properties of silver ions

GROWTH STRATEGIES: Seek opportunities to license platform technology to product manufacturers, and marketing partners

CONTACT: Rod Precht, President and CEO, rod@excitontech.com, 780.248.5868



Photo credit: Exciton Technologies Inc.

Applied Nanotools

High end optics and calibration standards for the microscopy community

Applied Nanotools is an instrument builder of nano-related devices and products to support microscopy in the nanotechnology. One of its first successful products was a calibration standard, as pictured, that acts as a nano ruler to calibrate the length scales of images taken by high-end microscopes. Its new product initiative is to create the world's first commercial x-ray microscope.

COMPANY: Applied Nanotools Inc., www.appliednt.com, 4 employees, founded 2002, revenue-funded, product sold world wide, 4465 - 99 Street, Edmonton, Alberta T6E 5B6, 780.432.5866

PRODUCT: High end optical components for x-ray analysis

GROWTH STRATEGIES: Seek investors, marketing partners and product development partners

CONTACT: Dr. Mirwais Aktary, CEO and co-Founder, info@appliednt.com, 780.432.5866

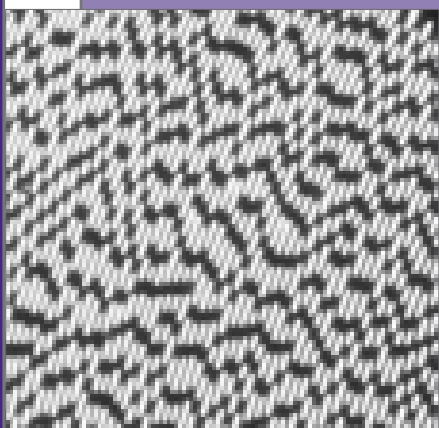


Photo credit: Applied Nanotools Inc.

IPL

Recyclable plastics for eyeglasses

Most eyeglasses sold today are made with virgin plastics. IPL is investigating a new composite material based on *recycled* plastics that would produce eyeglasses that are stronger, more cost effective, and environmentally friendly (since they are made with recycled plastics). IPL plans to sell its new eyeglasses at its store **Smith and Wight** (102 - 2731 Hewes Way, Edmonton).



Photo credit: Marta Dehne

COMPANY: IPL Inc., www.smithandwight.com, 4 employees, founded 1999, revenue-funded, product sold worldwide, new composite eyeglasses in R&D stage, 102 - 2731 Hewes Way, Edmonton, Alberta T6L 6W6

PRODUCT: Producer and distributor of eye glass frames

GROWTH STRATEGIES: Seek marketing partnerships and international distributors

CONTACT: Karim Walli, Founder and CEO, karim@smithandwight.com, 780.450.3808

Intelligent Nano

Precisely killing cancer cells and reducing patient suffering

Two professors from the University of Alberta, Dr. Chen and Dr. Xing, are leveraging their discovery: They have developed intelligent nanoparticles (pictured on right) that bind themselves to cancer cells. They have designed treatments that focus on killing these cancer cells precisely without damaging healthy tissue, thus reducing a patient's suffering. Additional revolutionary benefits include being able to "see" the cancer once treatment has started, and being able to kill cancer cells in hard to reach places of the body such as the pancreas.

COMPANY: Intelligent Nano Incorporated, www.intelligentnano.com, 4 employees, founded 2008, University of Alberta spinoff, self-funded/grant-supported, first pre-clinical product ready to sell for lab and animal use, 4th floor, 11421 Saskatchewan Drive, Edmonton, Alberta T6G 2M9, 780.492.9820

PRODUCT: "Intelligent" nanoparticles for cancer diagnosis and treatment

GROWTH STRATEGIES: Seek CEO, partnership with bigger company for FDA approval and marketing, and partnerships with doctors

CONTACT: Dr. James Xing, President and co-Founder, jzxing@ualberta.ca, 780.862.7496/Dr. Jie Chen, VP and co-Founder, jc65@ualberta.ca, 780.492.9820

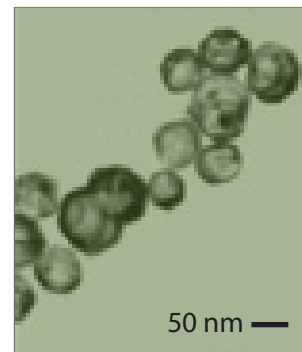
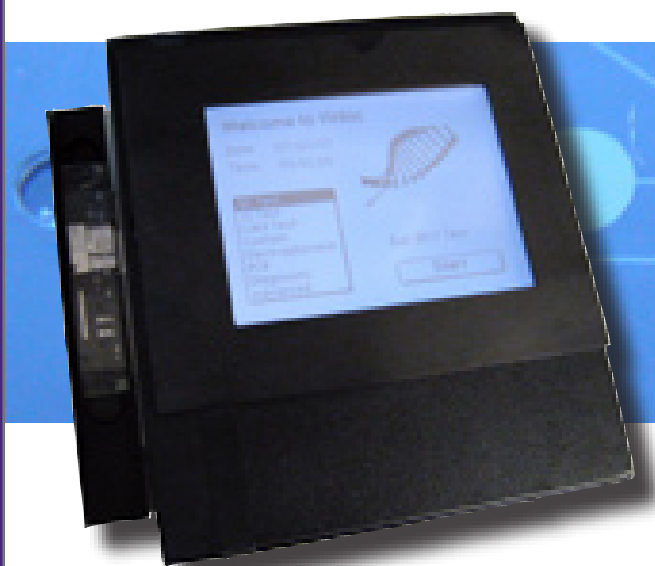


Photo credit: ABOVE: Intelligent Nano. BELOW: Jyn Meyer

i-LOC

Lab on a chip: Scourge of the super bug



Pictured in blue above is a closeup of i-LOC's MEMS chip. To the left is i-LOC's current product getting ready for FDA testing in 2009. Photo credit: i-LOC Corp.

One of the afflictions of our times that has gained a secure hold on the popular imagination is hospital "super bugs". The challenge for hospitals is that these spread so quickly because they flourish in environments where there are many weakened people. The major hope for at least controlling these infectious diseases—both when patients first enter a hospital and when an in-patient becomes infected—is a test that can identify the bug quickly so that hospital staff can isolate the infected person for treatment and stop the spread of the infection.

A good example is Methicillin-resistant *Staphylococcus aureus* (MRSA), which is a type of "staph" bacteria that are resistant to many antibiotics. The trouble is that the test to identify the bacteria requires at least three days to grow a culture and by then it may be too late to stop the spread of the infection. A hand-held device that can identify MRSA in about 30 minutes is being developed by i-LOC, a research company established in 2006. It is

expected that the device will go on the market in about two years' time. Prior to this, the company is launching a similar test for the BK virus, a much more common virus that does not have serious consequences except for immuno-compromised patients, particularly kidney-transplant patients. The test for the BK virus, for which the company has a successful prototype, will be ready for launching on the market next year. It is a smaller market than MRSA and serves primarily as a proof of concept. The market for MRSA tests exceeds \$100 million a year. i-LOC is also developing a test for the large influenza virus market.

The device is a lab on a chip developed by two researchers at the **University of Alberta** (p.43). **Linda Pilarski**, a Professor of Oncology, had been working on a similar test for cancer for some time when she was approached by **Chris Backhouse**, a Professor in the Faculty of Engineering. Backhouse suggested that his expertise in microfluidics may be helpful to her line of

research. She jumped at the chance and the two have worked in close collaboration ever since. Together they have designed a small lab on a chip that can take a fluid sample into one of its nano-wells, manipulate it through various nano-channels to conduct the tests that can identify diseased cells or DNA and deliver a result in a matter of minutes.

Their technology has been licensed to i-LOC, which has chosen to develop the test for infectious diseases first because it is a larger and more urgent market. As it applies to infectious diseases, the lab on a chip (which is about 2 square inches), takes a sample of urine, a tissue swab or blood and pumps it down to a nano well and replicates the DNA millions of times, which it then propels through its nano-channels to identify the target DNA accurately for the viral mutation.

Pilarski's and Backhouse's joint research is conducted in a lab called **Alberta Cancer Diagnostic Consortium (ACDC)**, (p.46), which was built with financial assistance from **Western Economic Diversification Canada**, the regional development arm of the federal government. The lab is in the Faculty of Engineering and the bio-medical staff work there in a tight relationship with the engineers. The formation of this lab involved several partners, including the **Alberta Provincial Laboratory**, which helped with early-stage clinical trials, the **Alberta Heritage Foundation for Medical Research (AHFMR)**, (p.46), **Alberta Ingenuity Fund** (p.42) and **MSTRI** (MicroSystems Technology Research Initiative, p.41).

i-LOC is being launched through **TEC Edmonton** (p.42), the commercialization arm of the university that is a partnership with the city's development agency. TEC Edmonton incorporated i-LOC and financed the startup through all its legal hoops; the first employee was hired

in April, 2007 and recently **Dr. Randall Yatschoff** was appointed Acting CEO. Yatschoff is the former CEO and co-Founder of **Isotechnika Inc.** (TSX:ISA), a leading Canadian biopharmaceutical company. He is a new Executive-in-Residence at **TEC Edmonton**, sponsored by AHRMR to help new technology companies get off the ground.

The technology that i-LOC controls is a platform technology—it can be applied to multiple needs and situations—so there is a huge array of potential applications—among them, identifying many other infectious diseases, blood and tissue types, potential drug reactions, cancers, and even bio-terrorism agents in the bio-threat market. Initially, the company will out-source most of its marketing and distribution as well as its manufacturing, so that it can concentrate on the technology.

COMPANY: i-LOC Corp., www.ilocsolutions.com, 7 employees, founded 2007, TEC Edmonton/University of Alberta spin-off, prototypes done, testing to prepare for FDA trials in 2009, Room 4-071, 11421-Saskatchewan Drive, Edmonton, Alberta T6G 2M9, 780.492.9808

PRODUCT: Automated point of care diagnostic testing instrumentation for infectious diseases

GROWTH STRATEGIES/BIGGEST CHALLENGE: Seek local investors, clinical partners, global marketing partners and employees with clinical trials experience.

CONTACT: Andrew Pryor, VP Business Development, info@ilocsolutions.com, 780.977.5749

NOVA Chemicals

Lighter, superior performing advanced plastic can replace steel

NOVA Chemicals is one of Canada's largest producers of commodity plastics and chemicals, and has one of Alberta's largest R&D budgets. NOVA Chemicals has developed a special plastic called SURPASS® polyethylene which delivers superior strength and processing advantages, and can replace traditional materials such as wood and steel. NOVA Chemicals used this technology to create the COSMO™ container (pictured), an award-winning industry-first collapsible storage container called for use in the growing portable storage and moving market.



Photo credit: NOVA Chemicals Corporation

COMPANY: NOVA Chemicals Corporation, www.novachem.com, 1160 employees in Alberta, founded 1998, publicly traded on TSX and NYSE as NCX, SURPASS® polyethylene is sold worldwide, COSMO™ container, will launch in early 2008, R&D facility at 2928, 16 Street NE, Calgary, Alberta T2E 7K7, 403.250.0633

PRODUCT: Superior strength plastic for the rotational molding industry; collapsible storage container

GROWTH STRATEGIES: Seek marketing partners

CONTACT: Eric Kelusky, Vice President of Technology, keluskec@novachem.com, 412.490.4543

Aurora NanoDevices

Ensuring that what you observe is what is actually there

An atomic force microscope (AFM) is one of several instruments in the nanotechnology field used to characterize material surfaces. The AFM essentially operates by running a sharp tip over a sample surface, similar to the needle in an old record player. When the tip interacts with a bump or valley, it adjusts upwards or downwards. This movement is used to produce an image of the sample's surface. Over time, the AFM tip gets dull, which affects how precisely the image matches the true surface morphology. Aurora's nano-scale surface devices can be used as a standard against which AFM users can quickly and inexpensively measure the sharpness of their AFM tip.

COMPANY: Aurora NanoDevices Inc., www.aurorand.com, 2 employees, founded 2001, revenue-funded, product distributed worldwide, R&D in Alberta, PO Box 52150, Edmonton, Alberta T6G 2T5, 250.739.2161

PRODUCT: Calibration surfaces for atomic force microscopy (pictured)

GROWTH STRATEGIES: Seek investors, and partners for new applications development

CONTACT: Brian Dick, President and co-Founder, brian@aurorand.com, 250.739.2161

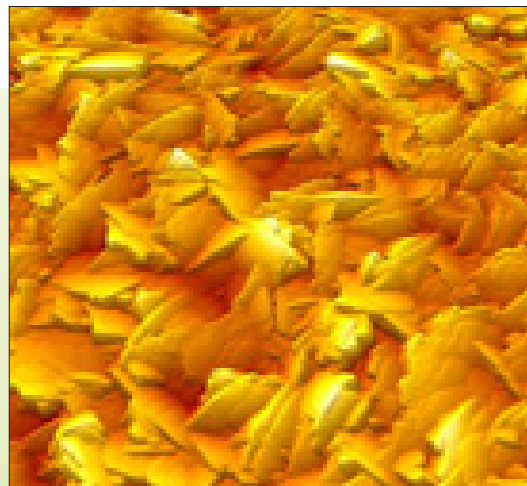


Photo credit: Image Metrology Inc.

Hyperion Technologies

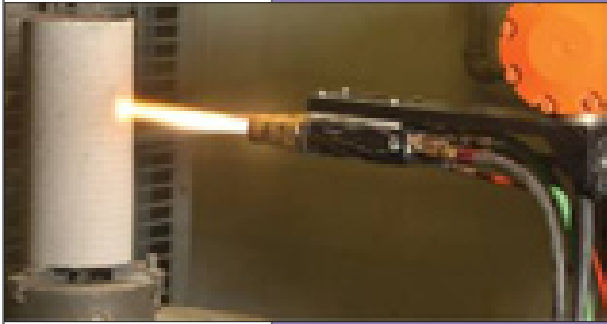


Photo credit: Hyperion Technologies Inc.

Advanced nanoparticle based coatings

Hyperion Technologies can take an item, such as a part that's expensive to make or made of an expensive material, and produce it out of a cheaper material with a nanoparticle coating to give it the same or superior resistance to wear, erosion, corrosion, and abrasion. Hyperion's clients come from a range of industries including oil and gas, oil sands, aerospace, agriculture, mining, automotive, paper mills, power plants, and defense. Pictured is the robotic plasma spray application of a nanocoating.

COMPANY: Hyperion Technologies Inc., www.hyperiontechnologies.com, 60 employees, founded 2003, product sold worldwide, revenue-funded, 6732 – 8th Street NE, Calgary, Alberta T2E 7H7, 403.221.1410

PRODUCT: Advanced nanoparticle-based coatings

GROWTH STRATEGIES: Seek new applications of coatings, and joint ventures with coating companies around the world

CONTACT: Anthony (Bunny) Bundell, Director of Business Development and Sales, bbundell@hyperiontechnologies.com, 403.613.0885

Black Cat Blades

Nano coated blades that last

Black Cat Blades designs, manufactures and markets all kinds of blades for earthmoving equipment in the mining, road maintenance, construction and oil industries. These blades are exposed to lots of abrasive contact that can wear them out, but Black Cat Blades protects their blades to make them longer lasting by coating them with a nanoparticle coating, including a new iron-based formula. Examples are pictured below.



Photo credit: Black Cat Blades

COMPANY: Black Cat Blades Ltd., www.blackcatblades.com, 350 employees worldwide, founded 1968, revenue-funded, product sold worldwide, 5604-59 Street, Edmonton, Alberta T6B 3C3, 1.800.661.6666

PRODUCT: Ground-engaging parts for mining, construction and road maintenance

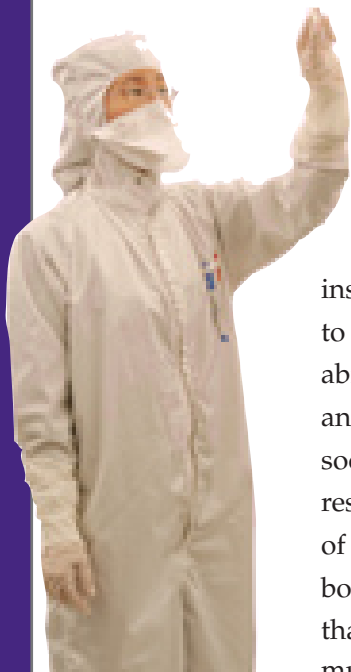
GROWTH STRATEGIES: Seek to license related technology to market through its strong dealer network, and seek research partners

CONTACT: Dr. Chinnia Subramanian, Director of R&D, chinnias@blackcatblades.com, 780.970.4235

Micralyne

Making nanoscale real

Micralyne is one of the centre-pieces of the micro- and nano-technology (MNT) industry in Alberta, providing a world-class MEMS (micro-electro-mechanical systems) company that ranks in the top four of the world's independent MEMS manufacturers. Its sales in 2007/2008 passed the \$23 million mark, on their way to a projected \$35-million-plus in 2008/2009.



The people who make MEMS chips at Micralyne wear "bunny suits" to protect the chips from human particles such as skin flakes and hairs. Photo credit: Micralyne Inc.

CEO, **Chris Lumb**, was brought into the company as the CEO in 1994 when it was still an institute within the **University of Alberta**. The institute was established in 1982 to provide researchers with the ability to make MNT prototypes and test them. But its services were soon picked up by companies and researchers far outside the confines of the university and institute's board decided in the early 1990s that its business had expanded so much that it no longer made sense to operate as a university-based, not-for-profit institute. Lumb was given the mandate to spin the institute out of the university, which he did in 1998.

It was not an easy transition. Lumb describes himself and his colleagues at the time as "a bunch of research heads who did good

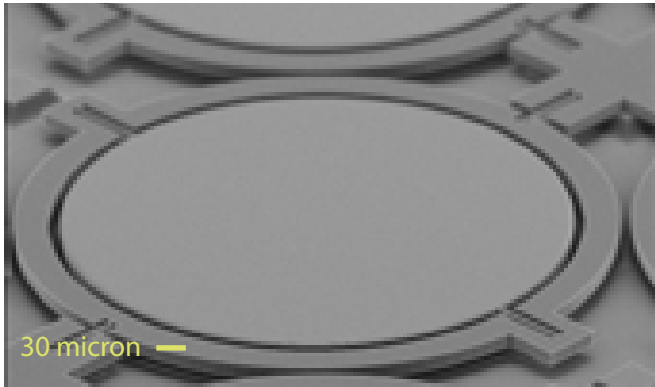
prototypes." In fairly short order, they changed the culture, developing a business mentality appropriate for a comprehensive product development company and building the business infrastructure and capability. The company attained its ISO 9001 certification three years after it was launched.

Part of the purchase agreement with the university was that Micralyne agreed to provide a substantial amount of funding to the university for research over the following ten years—and the company has given them about \$500,000 a year since then. This proved to be more of an investment than an expense, as it created strong links with the research community in the university, which promoted growth of the company and the MNT industry in the region.

The MNT industry is highly capital intensive, and as the technology advances, sustaining a state-of-the-art capability can be expensive. Yet Micralyne has succeeded in assembling a comprehensive suite of MEMS equipment. Part of it was luck. After the technology bubble burst in 2001, there was a lot of state-of-the-art equipment available at very low prices over the following three years. Despite the availability of used equipment, capital expenditures remain high and are a significant barrier to entry for competitors.

Micralyne produces MEMS chips as OEM components for its customers, designed to their specifications, that their customers embed into larger products. Examples of MEMS chip including the following:

Optical MEMS: One type of optical MEMS is an optical switch that contains thousands of individually controlled micro-mirrors that can switch light on and



A closeup of an optical switch (it's a single micro-mirror) used in telecommunications. Photo credit: Micralyne Inc.



A single MEMS chip could have thousands and thousands of optical mirrors on it. Photo credit: Micralyne Inc.

off several million times a second. There is a large demand for optical switches in telecommunications. Other applications include everything from such bread-and-butter uses as bar-coding to such exotic applications as laser surgery.

Microfluidics or **lab on a chip** are devices that integrates many laboratory operations to produce a lab result in a few minutes or hours instead of several days. This miniaturization also saves costs associated with laboratory equipment and staff. It requires only a tiny sample size and is a few millimeters to a few square centimeters in size. Lab on a chip devices are being developed primarily for biological and clinical analysis. Micralyne has created a microfluidic toolkit that reduces the time and effort it takes its customers to design a lab on a chip to maybe a quarter of what it would have taken to produce it from scratch.

MEMS sensors are able to sense motion (acceleration or vibration) in distinct directions. The automotive industry was one of the first to use them; they are the brains that signal the release of an airbag (airbag accelerometer sensors). The consumer market has become a big and high growth industry using MEMS sensors in many applications. For example, cell phones and portable music players use MEMS sensors for "shake control" to recognize sudden movements as user

inputs; video-game controllers use MEMS sensors to replace joysticks and buttons.

The most important source of business for Micralyne is the telecommunications industry, where the demand has driven an increase of 55% in sales for the company in 2007/2008. Other important customers are in life sciences and related products, and chemical and industrial sensors. Over 95% of Micralyne's customers are outside Canada, and its customers include 10 "Fortune 100" companies.

COMPANY: Micralyne Inc., www.micralyne.com, 200 employees, founded 1998, University of Alberta spinoff, profit-funded, clients from around the world, 1911 - 94 Street, Edmonton, Alberta T6N 1E6, 780.431.4400

PRODUCT: MEMS product development and manufacturing

GROWTH STRATEGIES/BIGGEST CHALLENGE: Maintaining customer intimacy as the company matures

CONTACT: Chris Lumb, President and CEO, clumb@micralyne.com, 780.431.4400

Sulzer Metco

#1 global leader in thermal spray and plasma transfer arc wear resistance coatings

Sulzer Metco's advanced material powders have numerous applications: They are used for coatings that protect parts from wear in the oil sands and in drilling. Another application involves electromagnetic interference (EMI) shielding in portable electronic devices such as cell phones. The company manufactures powders, sells the thermal spray equipment to apply it, has a related coating services business unit and does R&D for new application development. Pictured is a thermal spray application of Sulzer Metco's advanced material powder.

COMPANY: Sulzer Metco (Canada) Inc., www.sulzermetco.com or www.conductivefillers.com, 70 employees in Alberta, founded 1954, revenue-funded, annual sales of \$60 million, 10108-114th Street, Fort Saskatchewan Alberta T8L 4R1, 780.992.5100

PRODUCT: Electromagnetic shielding powders for electronics; powders for hard facing coatings, integrated coating solutions for new-to-the-world applications

GROWTH STRATEGIES: Seek industrial partners needing an innovative coating solution

CONTACT: Mark Benz, General Manager, mark.benz@sulzer.com, 780.992.5185

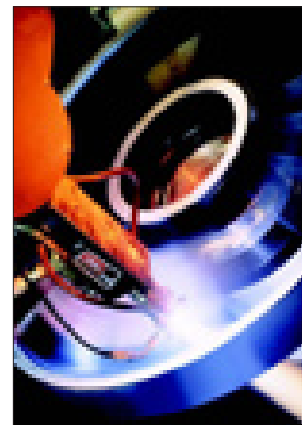


Photo credit: Sulzer Metco (Canada) Inc.

Norcada

The source of MEMS devices to researchers around the world

Norcada's specialties are custom MEMS mirrors for telecommunications, and silicon and nitride membrane windows for transmission electron microscopy (TEM) and X-ray microscopy for the research community. Norcada also provides MEMS prototype development and fabrication services to customers in Europe and North America, of all sizes and from many different industries. Pictured below are microgears in a MEMS chip produced by Norcada.

COMPANY: Norcada Inc., www.norcada.com, 5 employees, founded 2001, revenue-funded, services sold worldwide, 4465 - 99 Street, Edmonton Alberta T6E 5B6, 780.431.9637

SERVICE: MEMS prototype device development

GROWTH STRATEGIES: Seek clients and partners for new applications development

CONTACT: Graham McKinnon, CEO and co-Founder, graham@norcada.com, 780.431.9637

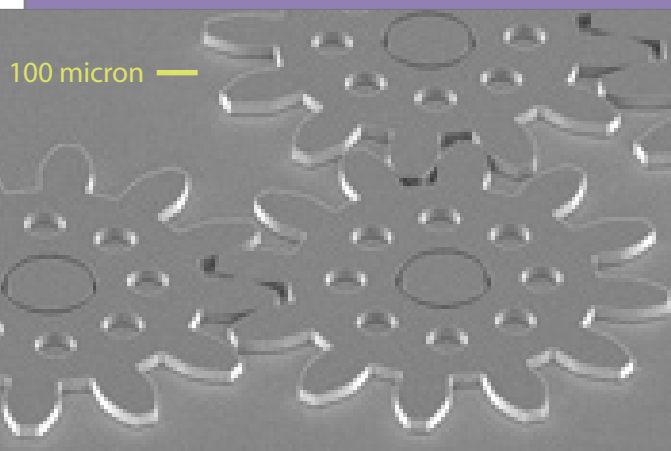


Photo credit: Norcada Inc.

Artsinteg

MEMS and nanosystem product development services

Artsinteg offers clients product design and development services in product applications involving MEMS and nanotechnology. Having created a proof of concept, the company is also prototyping its own first MEMS based product for the oil and gas industry. Artsinteg's technology is made in a clean room, as pictured.

COMPANY: Artsinteg Corporation, www.artsinteg.com, 4 employees, founded 2004, revenue-funded, 5008-122 A Street, Edmonton, Alberta T6H 3S7, 780.443.5881

SERVICE: Product development leveraging MEMS and nanosystem technology

GROWTH STRATEGIES: Seek investors, and partners for new applications development

CONTACT: Huy Nguyen, CEO and Founder, huy@artsinteg.com, 780.443.5881

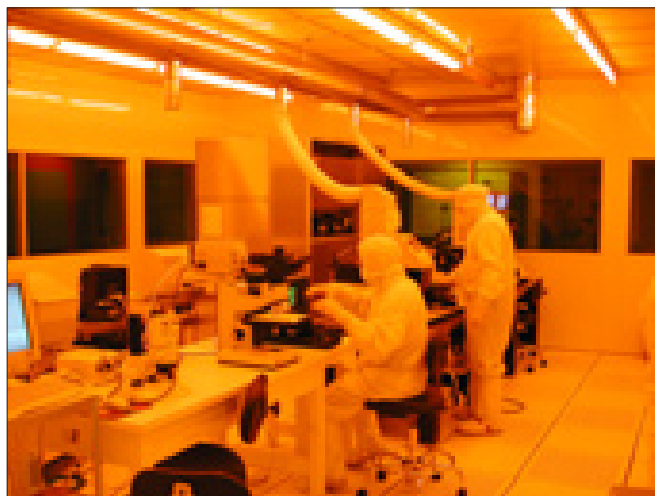


Photo credit: Norcada Inc. at NanoFab at University of Alberta

HydroQual Laboratories

Canada's first commercial toxicity testing of nano materials

Are there any toxic environmental effects associated with the use of nano materials? With funding from **Alberta Ingenuity**, HydroQual has refined established methods to develop new protocols to assess the effects of nanoscale particles on the environment and human health. The company now offers this new service to businesses and research institutions.

COMPANY: HydroQual Laboratories Inc., www.hydroqual.ca, 25 employees, founded 1993, nanoparticle testing just launched, other lab services well-established, revenue-funded, Unit #4, 6125 12 Street SE, Calgary, Alberta T2H 2K1, 403.253.7121

SERVICE: Toxicity testing of nanoparticle materials

GROWTH STRATEGIES: Seek new clients and marketing partners

CONTACT: Stephen Goudey, President, sgoudey@golder.com; Dr. Sylvia Chan-Remillard, Scientist, schanremillard@golder.com, 403.253.7121

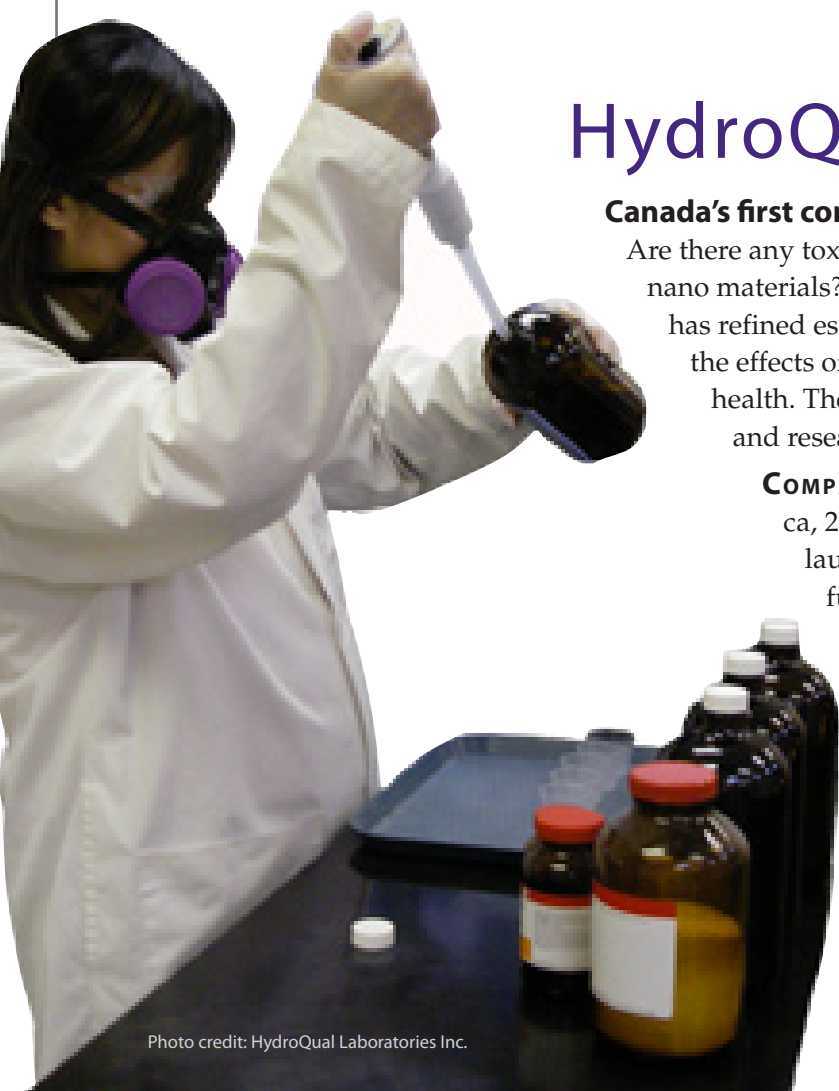


Photo credit: HydroQual Laboratories Inc.

NUCRYST Pharmaceuticals

World's first commercially successful application of nanotechnology to a medical therapeutic

The healing properties of silver have been known since the time of Hippocrates and, as recently as during World War I, it was extensively used to dress wounds. It has now been largely replaced by anti-biotics, but it may be about to enjoy a resurgence as its properties become better understood—a process that can only be achieved through nanotechnology.

The man who has played a major part in this development, the world's first commercially successful application of nanotechnology to a medical therapeutic, is **Dr. Rob Burrell**, Professor in the Department of Chemical and Materials Engineering and Canada Research Chair in Nanostructured Biomaterials as well as Professor and Chair of the Department of Biomedical Engineering at the **University of Alberta** (p.43). He developed the process for creating nanostructured silver that releases, into solution, new silver compounds/species that each possesses unique properties.

His research has not produced a theoretical proof of his concept, but the results are irrefutable—last year, the sales of his antimicrobial wound dressing, Acticoat® were \$54 million. He has numerous testimonials of its astonishing power to heal wounds, reduce inflammation and kill bacteria.

Burrell uses a materials coating technique called “sputtering” which takes place in a chamber with very low atmospheric pressure and a tiny amount of inert argon gas. When an electric charge is passed through the chamber, positively charged argon ions are created and propelled at great speed against a negatively charged bar of silver. When the argon ions hit the silver bar, they

NUCRYST was unable to participate in the preparation of this article. The new President, CEO and Chairman of NUCRYST, Thomas Gardner, was involved in a strategic reassessment of the company and he was not in a position to talk to the public prior to informing the shareholders.

knock groups of two to eight atoms out, which travel through the chamber to a substrate of polyethylene that catches them. Under the right conditions this forms a silver nanostructure. The silver compounds that are released into liquids (such as wound fluids when used on a patient) include pure silver atoms (Ag^0), oxidized silver (Ag^+ for short) and a third molecule, which Burrell thinks contains a highly oxidized silver atom (Ag^{+3}). Burrell says the properties of Ag^+ do not contribute to healing—in fact they may be slightly pro-inflammatory. But clinical tests have suggested that the Ag^0 is strongly anti-inflammatory and the Ag^{+3} is strongly anti-microbial.

Burrell has been working in “thin materials” since the 1980s, when he worked in **Alcan's** labs for advanced materials, then one of the top three in the world in that field. When Alcan closed the lab, he went to **Westaim** (Western Advanced Industrial Materials) in Alberta. Westaim has been a pivotal player in advanced materials in Alberta, having started out as a well-funded spin-off from **Sherritt-Gordon** (now **Sherritt International**) in partnership with the governments of Canada and Alberta. The company had seven subsidiaries operating out of its complex in Fort Saskatchewan, one of which was **Westaim Biomedical**, which ultimately became **NUCRYST Pharmaceuticals**. At Westaim Biomedical, Burrell worked as VP and

Chief Scientific Officer and wrote, with Cathal Tunney, the first business plan for the company.

Westaim has since slimmed down, selling or closing most of its subsidiaries to the point where only two are now left; one of them is NUCRYST, in which it holds 75% of the shares.

The Acticoat® wound dressing received approval from the Food and Drug Administration in 1995, and the product was put on the market two years later. The company signed a distribution deal with **Smith & Nephew** and subsequently renegotiated it to give NUCRYST about half of the revenues flowing from the sale of Acticoat®. Smith & Nephew is a UK-based pharmaceutical company with annual sales of \$3.4 billion last year; its division for advanced wound management is the second largest in the world.

NUCRYST went public in 2005, issuing its shares at \$10. They rose to \$16 by the summer of 2006, then tumbled to less than \$2 a year later. Recently they have been trading at \$1.

The problem for the company was its attempt to create a moisturizing cream for atopic dermatitis containing the same ingredients as Acticoat®, adapted to a powder form. The clinical trials were abandoned in late 2007; the trials showed some improvement with the cream, but not enough to differentiate it from the placebo.

Burrell is no longer with the firm, having left after a disagreement with the management at the time. But he says he would still be interested in working with NUCRYST under its new CEO, **Thomas Gardner**.

As much as the atopic cream was a disappointment for NUCRYST, the basic technology has the potential to create multiple applications. Burrell explains that all the noble metals (gold, platinum, silver) have anti-inflammatory properties, especially when they are in a nanostructured form. Gold is already recognized for its impact on rheumatoid arthritis and platinum has demonstrated the capacity to reduce tumors, especially for testicular cancer.

“We’re barely scratching the surface,” says Burrell. “The surfaces [of polynanocrystalline silver] are highly catalytic and catalysis is one of the areas

where nanotechnology will have a big impact. The biggest impact will be in the medical field—modifying surfaces, therapeutic applications and mimicking the body. I think there are a whole lot of things that will come out of this including immunomodulation, anti-inflammatory and anti-microbial agents, and perhaps anti-tumor activity when we understand how these unique forms of material behave in biological systems.”



A sputter machine used to produce nanoparticles.
Photo credit: NanoFab at University of Alberta

COMPANY: NUCRYST Pharmaceuticals Corp., www.nucryst.com, 95 employees in Alberta as of in 2005, founded 1997, product sold worldwide, publicly traded on NASDAQ as NCST and TSX as NCS, 10101 - 114 Street, Fort Saskatchewan, Alberta T8L 3W4, 781.224.1444

PRODUCT: Identifies noble metals with known therapeutic qualities and uses its platform nanocrystalline technology to create drugs, medical devices, or medical coatings with potentially enhanced therapeutic qualities.

CONTACT: www.nucryst.com

NovAtel

GPS and MEMS chips help farmers guide tractors

NovAtel produces high-precision receivers and components based on global positioning system (GPS) technology. Its products, as the electronic boards pictured on the right, form the navigational brains of larger products that move. NovAtel's MEMS based product helps farmers navigate their tractor faster and straighter along the virtual roads in their fields within 10 cm accuracy.

COMPANY: NovAtel Inc., www.novatel.com, 270 employees, founded 1978, product sold worldwide, revenue-funded, 1120 - 68th Avenue NE, Calgary, Alberta T2E 8S5, 1.800.NOVATEL

PRODUCT: GPS navigation systems plus gyro and communications

GROWTH STRATEGIES: Seek partnerships for new applications, and more marketing partners

CONTACT: Graham Purves, VP Sales, Graham.Purves@novatel.com, 403.295.4964

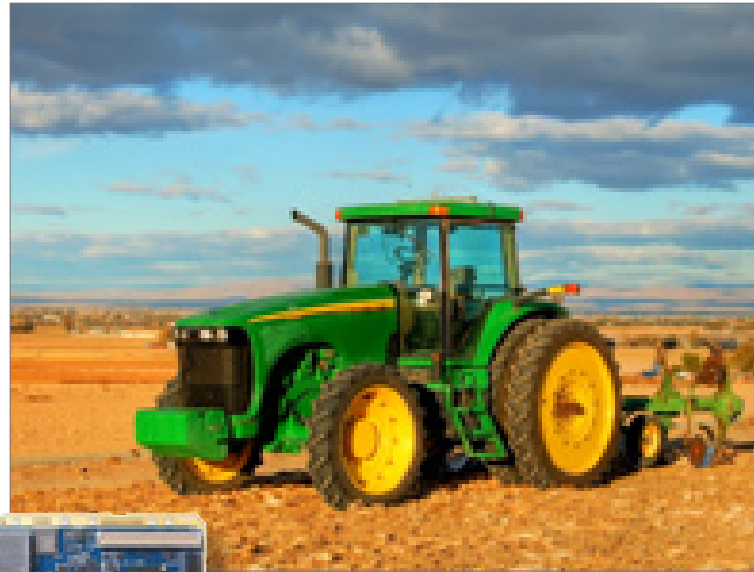
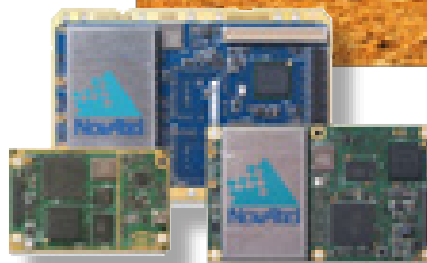


Photo credit: ABOVE: Benjamin Earwicker, LEFT: NovAtel Inc.



Indexable Cutting Tools

Superman-strength ceramics used to machine metal

Indexable Cutting Tools manufactures one of the strongest, wear resistant ceramics used in the automotive and aerospace industry to machine metals from the hardest cast irons to the toughest high-temperature alloys. Made of silicon nitride, this Alberta produced ceramic can cut materials to a tight tolerance and smooth surface finish at high speeds for long operating cycles. Pictured is a closeup of the self-reinforced ceramic microstructure of the ceramic produced by Indexable Cutting Tools, which is not a normal surface.

COMPANY: Indexable Cutting Tools Inc., www.indexable.com, 12 employees, founded 2000, revenue-funded, product used worldwide, 6303 - 76 Avenue, Edmonton, Alberta T6B 0A7, 1.800.446.4946

PRODUCT: High end cutting tools

GROWTH STRATEGIES: Seek clients and partners for new applications development

CONTACT: John Precious, President, johnp@indexable.com, 1.800.446.4946

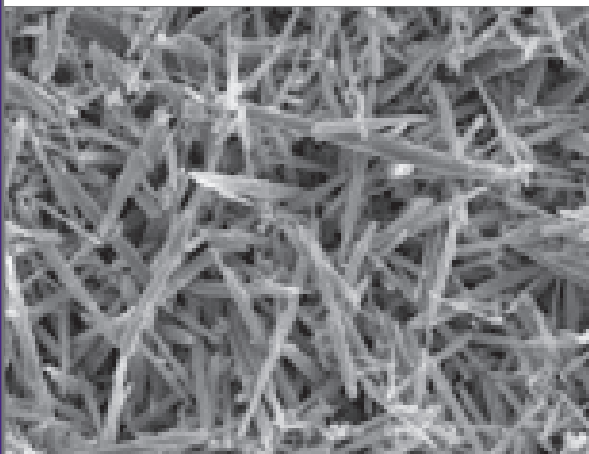


Photo credit: Indexable Cutting Tools

Alberta Nanometals

New formulation of metallic nanoparticles

Not all metallic nanoparticles are the same. Alberta Nanometals is based on the discovery that it can produce sphere-shaped metallic nanoparticles, using a sieve-based surface, at a small fraction of the cost of other techniques. Its first set of products is based on leveraging the anti-microbial benefits of silver for wound dressings and bandages. Pictured is microbial growth suppressed by a silver nanoparticle. Other applications include utilizing the unique adsorption properties of noble gases (radon, xenon) and mercury vapour capture, electronics and conductive inks.

COMPANY: Alberta Nanometals Inc., (no website yet), 780.432.7094, 3 employees, founded 2008, University of Alberta/TEC Edmonton spinoff, product ready for sale and negotiation with first set of clients underway, 4000, TEC Centre, 10230 Jasper Avenue, Edmonton, Alberta T5J 4P6, 780.432.7094

PRODUCT: Metallic nanoparticle formulation

GROWTH STRATEGIES: Seek marketing partners, and development partners to apply technology to new applications

CONTACT: Dr. Steven Kuznicki, stevekuznicki@albertaadsorbents.com, 780.432.7094

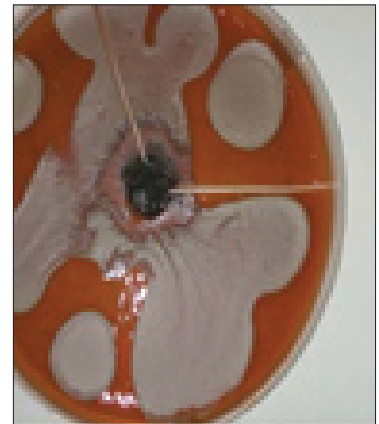


Photo credit: Alberta Nanometals Inc.

Shaw Pipe Protection

Pipe leader for oil, gas, and water pipelines

Shaw Pipe Protection provides coatings to protect pipelines used to transport oil, gas and water from industry producers. These coatings give the pipes enhanced properties such as anti-corrosion and thermal insulation. One coating Shaw Pipe Production uses is a nanotechnology material called Aerogel to insulate above ground pipelines, pictured below.

COMPANY: Shaw Pipe Protection Ltd., www.shawpipe.ca, 500+ employees, founded 1950, revenue-funded, publicly traded on TSX under parent SCL.A, product sold worldwide, 1824 Crowchild Trail NW, Calgary, Alberta T2M 3Y7, 403.263.2255

PRODUCT: Pipe coatings for buried and above ground service pipelines

GROWTH STRATEGIES: Seek partnerships in product development and marketing

CONTACT: Geoff McFarlane, Marketing Manager, gmcfarlane@shawpipe.ca, 403.218.8209

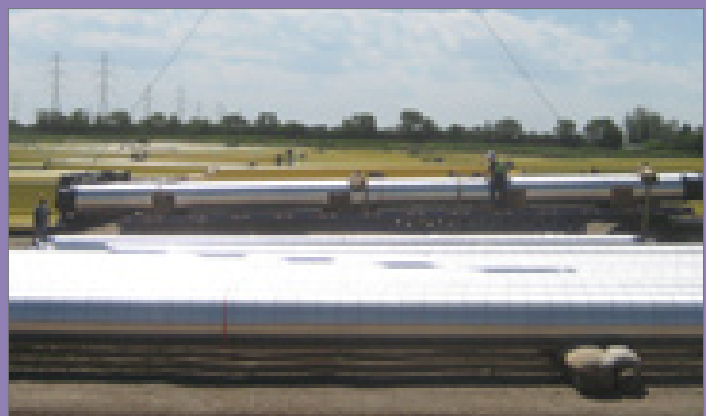


Photo credit: Shaw Pipe Protection Ltd.

Quantiam Technologies

Making a difference at 1100°C

Quantiam Technologies Inc. does not yet rank among the giants of nanotechnology firms in Alberta. But that may be about to change. The company has made some remarkable technological discoveries in the decade since it was founded and they are now beginning to bear fruit; Dr. **Steve Petrone**, Quantiam's President, is projecting annual sales to exceed \$50 million by 2013, a quantum leap from the current \$3 million, with only 15 employees.



Quantiam's pilot manufacturing plant: coating-in-progress and prototypes ready to be shipped for field trials. Photo credit: Quantiam Technologies Inc.

The source of Petrone's confidence comes from significant breakthroughs in nano-enabled coatings and surfaces. One family of products are catalyst coatings for petrochemical plants currently operating at the limits of materials technology. The new technology has been coined Catalyzed-Assisted Manufacture of Olefins (CAMOL for short) and has the potential to radically alter the economics of petrochemical plants. The technology has been successfully demonstrated

at laboratory and pilot-scale, and since 2006, proved in field testing. The company is currently designing a new factory to manufacture the coated product and will launch in the first half of 2009.

This technology was developed in partnership with **NOVA Chemicals** (p.16). The budget for the project was \$17 million, including \$3.5 million from **TPC (Technology Partnerships Canada)** and \$1.5 million from **Sustainable Development Technology Canada**. Quantiam and NOVA covered the remaining \$12 million. "That took seven years and over 100 person-years at four Canadian sites, three in Alberta," says Petrone, "but we did it—NOVA and Quantiam are leaders in this field, worldwide and second-to-none."

The testing of the coating will continue through 2008 and targets to map out operating regimes for the technology worldwide. There are ~1,400 furnaces worldwide, each with 1000-7000 feet of tubing per furnace, literally providing billions of square inches of surface area just waiting to be harnessed catalytically for economic and environmental benefits.

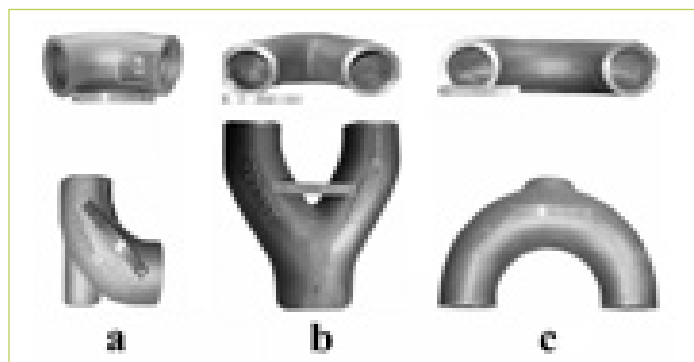
In economic terms, that boils down to significant incremental savings on operating costs and energy, plus a major reduction in greenhouse gas emissions. Petrone's ambitious target for sales to rise above \$50 million by 2013 is based on Quantiam's securing significant penetration of the world market for CAMOL and its Wear coatings across a broad range of applications.

The critical invention in CAMOL was recognizing unique properties of the coating available only at the nanoscale of matter. Petrone's team identified 21 necessary properties for the product (four of them at

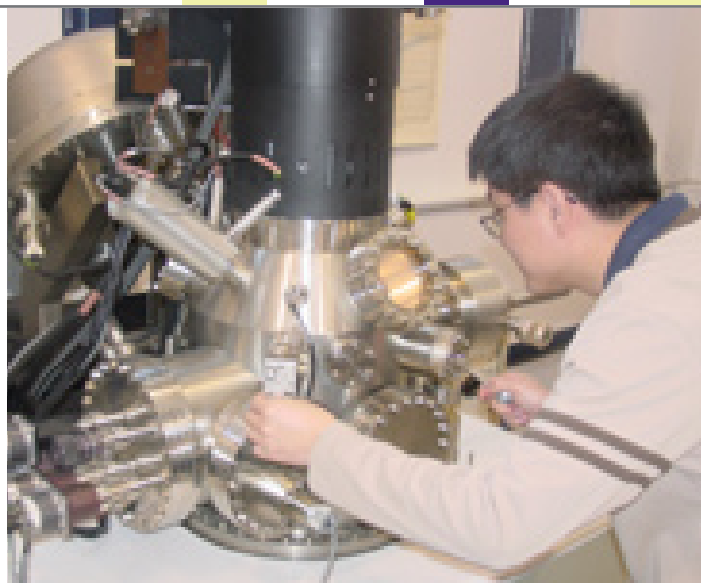
nanoscale); these included properties varying from a coefficient of thermal expansion that matches that of the base steel (which preserves the coating in the event of an emergency shut-down) to a catalytic efficacy that allows the plant to operate more profitably and with a reduced environmental footprint.

The CAMOL development was completed at the end of March, 2008 and Petrone was looking for an encore. "You can't stand still," he says. "We have two programs for new products at the moment, one in field trials and the other in the process of commercialization." These are the CAMOL catalyst coatings, and protective wear coatings for industrial components and ballistic protection.

Quantiam's protective wear coatings are designed to achieve the hardness of ceramics, together with high fracture toughness (meaning its ability to withstand impact) and the ductility (flexibility) of metals. These protective coatings have numerous applications in industries such as aerospace, automotive, chemical process industries, oil sands and mining. Petrone is also approaching the **US military** to interest them in numerous applications ranging from anti-land-mine coatings for armoured vehicles to ballistic protection for personnel.



Quantiam holds world records in uniquely achieving material hardness, fracture toughness and ductility with its nano-based coatings across a broad range of operating temperatures. Shown above are a range of complex shapes that are coated internally for hot erosion-corrosion service at 1000+°C, (a) 90° elbow; (b) wye fitting; and (c) 180° return bend. Photo credit: Quantiam Technologies Inc.



Quantiam has some of Canada's best instruments to characterize nanomaterials including this Field Emission Auger Electron Spectroscopy/X-ray Photoelectron Spectroscopy (FE-AES/XPS) unit, representing the only such capability in Canada's private sector. Photo credit: Quantiam Technologies Inc.

Petrone says that the life cycle of a major innovation in this field is four to seven years, so the company can be expected to introduce a major new product every 2-3 years. "I would like to get that up to one a year by adding a third program," he says.

COMPANY: Quantiam Technologies Inc., www.quantiam.com, 15 employees, founded 1998, revenue-funded, products sold world wide, 8207 Roper Road, Edmonton, Alberta T6E 6S4, 780.462.0707

PRODUCTS: (1) Nano-based catalyst coatings for petrochemical plants (CAMOL); (2) Nano-based protective wear coatings for complex-shaped industrial components across a broad range of temperatures; (3) materials for ballistic vehicular and personnel protection.

GROWTH STRATEGIES/BIGGEST CHALLENGE: Raising \$6.5 million to build and equip plant to manufacture CAMOL coatings and Wear coatings

CONTACT: Dr. Steve Petrone, President and Founder, spetrone@quantiam.com, 780.465.6670



Photo credit: Steve Woods

SciMed Technologies

Revolutionary and cost effective food testing

SciMed developed and sells VitaKits™ which are diagnostic tests to rapidly and accurately measure the concentration of Vitamin A and Vitamin D in milk. These kits have been a revolution to the industry and are used globally by dairy processors and analytical labs. To make these tests even faster, SciMed has evolved its product into MEMS lab on a chip devices, and its technology can be the foundation for many other tests to measure micro-ingredients in a wide range of food substances.

COMPANY: SciMed Technologies Inc., www.scimedtechnologies.com, 10 employees, founded 1999, revenue-funded, product sold worldwide, Suite 119, 9650 - 20 Ave Unit, Edmonton, Alberta T6N 1G1

PRODUCT: Food diagnostic tests

GROWTH STRATEGIES: Seek marketing partnerships, international distributors, and employees (business development, MEMS engineering)

CONTACT: Dr. Rajan Gupta, CEO and Founder, scimed@scimedlab.com, 780.702.1509

Advanced Integrated Microsystems

Huge time saver for mass spectrometer use

A mass spectrometer can screen blood for a protein marker that indicates a disease such as certain cancers, diabetes and Alzheimer's. Advanced Integrated Microsystems produces a MEMS lab on a chip (closeup section is pictured at right) that performs many of the steps required to prepare a sample for the mass spectrometer, saving time, money and increasing efficiency.

COMPANY: Advanced Integrated MicroSystems Ltd., www.aims-bio.com, 8 employees, founded 2001, University of Alberta spinoff, revenue-funded/grant-supported, product distributed worldwide, rapid prototyping and manufacturing in Edmonton, Alberta, head office at 535 Craigmohr Drive, West Vancouver, British Columbia V7S 1W8, 604.913.3300

PRODUCT: Turnkey solutions for sample preparation of mass spectrometry and liquid chromatography

GROWTH STRATEGIES: Seek investors, marketing partners, product development partners, distributors, and employees in sales and marketing

CONTACT: Dr. Archie Chonn, CEO and co-Founder, achonn@aims-bio.com, 604.913.3300

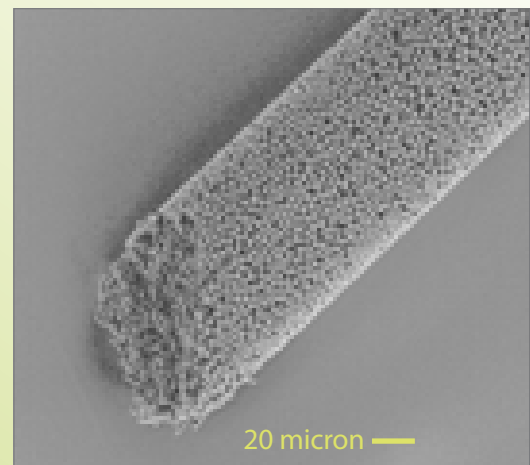


Photo credit: Advanced Integrated Microsystems Ltd.



Photo credit: Nick Cowie

PBR Laboratories

Rapid test system for cancer-causing chemicals

PBR Laboratories is a bioanalytical research laboratory. Using advanced material technology, PBR is prototyping a rapid test system that can determine whether a chemical has the ability to cause cancer. Compared to current testing methods, PBR expects its rapid test system to produce a significant reduction in time and cost, and increase testing efficiency and output.

COMPANY: PBR Laboratories Inc., www.pbr.ca, 10 employees, founded 1984, rapid test system in prototype stage, revenue-funded from well-established other lab services, 9960 - 67 Avenue, Edmonton, Alberta, T6E 0P5

PRODUCT: Rapid test system for cancer-causing chemicals

GROWTH STRATEGIES: Seek product development and marketing partnerships

CONTACT: Bern Philip, President, pbr@pbr.ca, 780.450.3957

Golder Associates

Assessing the risk of nanoparticles

Nanoparticles behave differently than regular particles, which is what gives them their interesting properties. This behavior also presents a new set of risks that most businesses based on a nanotechnology product have never explored. Golder Associates has just launched a new service that offers risk assessments of nanoparticle materials. The company believes it is the first service of its kind in Canada.

COMPANY: Golder Associates Ltd., www.golder.com, 2,500 employees, founded 1952, nanotechnology risk assessment just launched, revenue-funded from well-established business for other environmental health and safety assessments, 10th Floor, 940 - 6 Avenue SW, Calgary, Alberta T2P 3T1, 403.299.5600

SERVICE: Risk assessments of nanoparticle materials

GROWTH STRATEGIES: Seek new clients and marketing partners

CONTACT: Larry Kapustka, Senior Ecotoxicologist, larry_kapustka@golder.com, 403.253.7121



Photo credit: Golder Associates Ltd.

Resin Systems

A serendipitous revolution

Sometimes research is about creative searches for a solution to a specific challenge. And sometimes, what starts out that way turns into something completely different. This was the case with what is now called **Resin Systems Inc. (RS)**. In the late 1990s, it was called **Recycled Solutions for Industry** and it raised money to develop a technology that would recycle used tires to create industrial coatings to protect structures from corrosion.



RS's installed utility pole. Photo credit: Resin Systems Inc.

The company had some success; the product worked. But its competitors were large companies with powerful distribution networks and the differentiation of its coatings from theirs was not enough for it to have any impact on the market. The project was abandoned. However, in the final stages of their research, the company landed on an unexpected technological breakthrough—a polyurethane resin with properties that had never been demonstrated before. This new resin became the basis for their composite material and an entirely new venture and Recycled Solutions morphed into Resin Systems.

What distinguishes this new composite material made with this resin is its resistance to impact—it is dense and it can take a merciless pummeling and never crack or shatter. The polymer resin systems that have been manufactured for decades are mostly polyester compounds and the small production of polyurethane resins were, at that point, all foam products—used in car seats, or the arm rests of chairs, for example. None of these composites made with these resins exhibit much resistance to impact—they crack and bend. RS's composite does not; it is dense and hard. **Paul Giannelia**, President and CEO, says that the material is strong enough that it could be used for the deck of a bridge and easily withstand the pounding of heavy trucks without shattering.

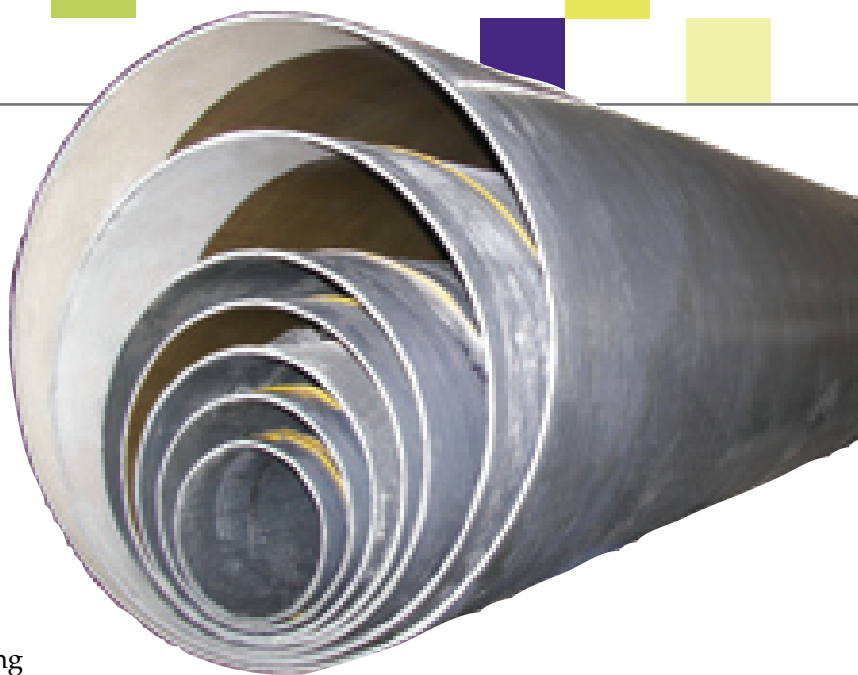
Unfortunately for RS, that proved to be the simplest part of their R&D. Polyester composites are relatively cheap to manufacture, partly because they are one-part resin. RS's resin (which it calls Version™) is two-part. The core is an aromatic compound which is immensely strong, but, like all polymers, it cannot resist ultra-violet light, which causes it to decompose after extended exposure. So RS had to develop a second compound, this time aliphatic, which can resist UV light, and weave that into the

perimeter of the composite. This was a lengthy project, helped enormously by the **Alberta Research Council** (p.42) which helped in the chemical research and did all the testing.

The next step was to develop a system for manufacturing the end product at a cost that would enable it to be marketed. This turned out to be even more challenging and accounted for the major part of RS's development spending. None of the equipment for existing filament winders could handle a two-part resin system. And once RS had developed the equipment and techniques to perform the necessary functions, it could not follow through with its plan to sub-contract the manufacturing process. None of the polymer manufacturers were prepared to uproot their systems to take on something completely new.

For a while, RS manufactured its own products, but they were not experienced manufacturers and it was inordinately expensive. In 2007, they reverted to their original plan and outsourced the manufacturing, but this time, they own the equipment and they train the sub-contractor's work force in the techniques they had developed. By the end of 2007, the company's first product was rolling off the assembly lines and meeting all the product specifications.

This product is utility poles—everything from the distribution poles along quiet suburban roads to very large transmission poles. RS's product can withstand all that nature can throw at the poles and it is modular, so it can supply any size of pole, which greatly reduces cost of customizing orders. And the composite RStandard™ poles have a life cycle of at least 80 years, vastly superior to the wood, steel and concrete poles that generally have a life span of about 40 years. Giannelia estimates he can



RS's utility pole is easy to store. Photo credit: Resin Systems Inc.

work up to a market share of 10% or more of the new and replacement utility poles in North America in five or so years—an ambitious target for a new company, considering the North American market spends \$8 billion a year (and the rest of the world four times that).

RS's second product is a conveyor roller tube that is used in conveyor rollers in mining and bulk-handling industries. This, too, has significant advantages over the steel rollers that predominate the market—mainly corrosion resistance, durability and weight. A distribution agreement has been signed and RS will sub-contract the manufacturing when volumes reach the required level.

The company expects to reach total sales of \$6 million a month by the end of 2008, which will put it in the black. Other products are in the development pipeline.

COMPANY: Resin Systems Inc., www.grouprsi.com, 70 employees, 1.877.219.8002, founded 1995, revenue-funded, product sold worldwide, 400, 2421 - 37 Avenue NE, Calgary, Alberta T2E 6Y7

PRODUCT: Products designed to replace wood, steel and concrete products in infrastructure market

GROWTH STRATEGIES/BIGGEST CHALLENGE: Seek clients and partners for new applications development

CONTACT: Laurien Abel, Investor and Public Relations, lauriena@grouprsi.com, 403.219.8000

Electronic Dietary Foods

Long-anticipated magic pill for the treatment of obesity

Obesity is a chronic medical condition without a "cure", where the only effective treatment for some is surgery that reduces the size of the stomach. Electronic Dietary Foods has been working on another option that is currently being tested with excellent results in preparation for commercial launch in 2009; their "magic pill" is an advanced material that expands in the stomach to make a person feel full as pictured and then disintegrates after 5 days and flushes out of the body.

COMPANY: Electronic Dietary Foods Inc., www.electronicfoods.com, 3 employees, founded 2005, startup phase, product in clinical trials in 2008 and launch expected 2009, 68 Signal Hill Way SW, Calgary, Alberta, T3H 2M2, 403.890.1557

PRODUCT: Producer of a new idea in diet supplements

GROWTH STRATEGIES: Seek marketing partnerships and international distributors

CONTACT: Dr. Martin Mintchev, President and Founder, mintchev@shaw.ca, 403.890.1557

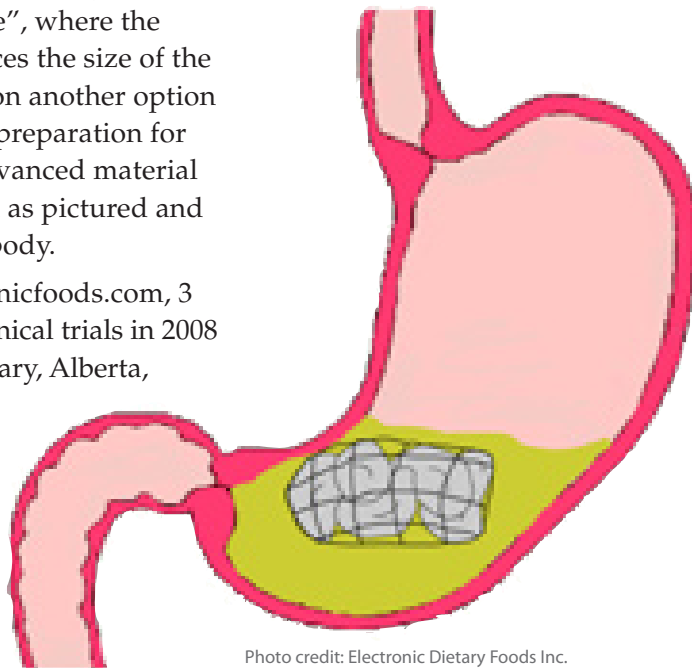


Photo credit: Electronic Dietary Foods Inc.

Hemisphere GPS

GPS guided marine navigation, tractor steering and cell phone tower orientation

Hemisphere GPS uses MEMS technology in some of its plug-and-play GPS applications. One application provides an accurate heading and position to help ships take the most efficient route and maximize the use of their automatic pilot system. Another application helps farmers drive their tractors on the most efficient routes in their fields. Hemisphere GPS also makes a GPS application to help efficiently orient cell phone towers and satellite dishes.



Photo credit: Hemisphere GPS

COMPANY: Hemisphere GPS, www.hemispheregps.com, 100 employees in Alberta, founded 1990, product sold worldwide, annual sales of \$58 million, public company traded on TSX as HEM, headquartered in Calgary with offices in USA and Australia, 4110 – 9th Street SE, Calgary, Alberta T2G 3C4, 403.259.3311

PRODUCT: Plug-and-play GPS systems for marine navigation, agricultural steering and cell phone tower orientation

GROWTH STRATEGIES: Seek system integrators for product development, international dealers and distributors, and investors

CONTACT: Dr. Mohamed Abousalem, Vice President Marketing and Business Development, mabousalem@hemispheregps.com, 403.259.3311

Aqua Screen

Water testing: simple, fast, cheap and super accurate

Aqua Screen has developed a portable, hand-held device (pictured on right) that can detect pathogens in water such as bacteria like E-Coli, with future versions expected to detect viruses and hormones. Aqua Screen's non-culturing process makes its product novel compared to traditional testing—it can produce test results in minutes instead of days, and it produces quantitative measurements of high quality at a fraction of the price. The company's future products will include ones with microfluidic technology.

COMPANY: Aqua Screen Corporation, www.aquascreeencorporation.com, 3 employees, founded 2006, startup, University of Calgary spinoff, head office in Edmonton: 1111-108 Street, Edmonton, Alberta, T6J 6H7, Laboratory research facilities in Calgary, 780.665.1599

PRODUCT: Water testing devices

GROWTH STRATEGIES: Seek marketing partnerships and international distributors

CONTACT: John Murphy, COO and co-Founder, jmurphy@aquascreeencorporation.com, 780.665.1599



Photo credit: Aqua Screen Corporation

NovaPure

Air filters proven to kill airborne bacteria, viruses and molds

Thanks to nanotechnology, NovaPure's air purifier products have redefined improved air quality. Air passing through a NovaPure air purifier comes into contact with a surface coated with nano-sized particles of titanium dioxide. In the presence of ultraviolet light like sunlight, these nanoparticles catalyze chemical reactions with the air particles thereby removing odors and chemicals, killing airborne microbes such as cold and flu viruses, and reducing other airborne contaminants such as dust and pollen.

COMPANY: NovaPure Inc., www.novapure.com, 5 employees, founded 2002, revenue-funded, product sold in North America, Bay 6, 3530 - 11 A Street NE, Calgary, Alberta T2E 6M7, 403.531.2091

PRODUCT: Very quiet air purifiers with unprecedented air quality results and no filters to replace

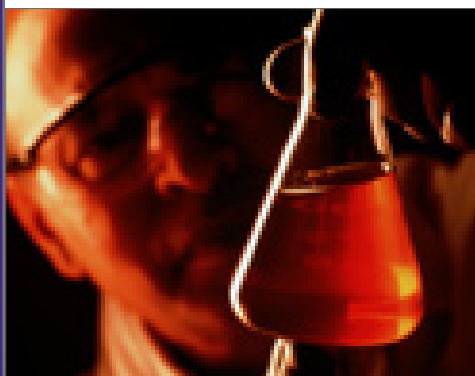
GROWTH STRATEGIES: Seek marketing partners in Canada and around the world to sell and distribute products

CONTACT: John Pink, President and co-Founder, jdpink@novapure.com, 403.770.1852



Photo credit: NovaPure Inc.

Corporate R&D in Alberta



Syncrude Sweet Blend oil. Photo credit: Syncrude

3M Canada

3M Canada has a research partnership with the **Alberta Research Council** (p.42) to develop pipeliners that can prolong the lifetime of pipes used in the Alberta oil sands. They are testing using epoxy and polyurethane composites.

CONTACT: www.3m.ca, London, Ontario, a diversified technology company, Bill Boyce, Alberta Regional Director, 1.800.265.1840

Syncrude Canada

"Syncrude spends more than \$40 million annually on research and development to help maintain our leadership position in the oil sands industry. One of our focus areas is on wear materials to extend the life of equipment that's subjected to erosion when processing high volumes of abrasive material."

—Alain Moore, *Public Relations*

CONTACT: www.syncrude.com, Fort McMurray, Alberta, oil sands processor, www.syncrude.com

HP Labs of HP Corporation

HP is working with NINT (p.48) to develop MEMS with integrated nanoscale sensors for medical and environmental diagnostics.

CONTACT: www.hpl.hp.com, Palo Alto, California USA, technology solutions, 650.857.1501

Raith

"Applied Nanotools (p.12) is engaged in a joint effort with Raith to develop a software simulator package that will be used for the development and design of next generation nanotechnology devices. Applied Nanotools provides the experimental expertise while NINT provides the theoretical understanding of the phenomenon for electron beam patterning."

—Dr. Mirwais Aktary

CONTACT: www.raith.com, Dortmund, Germany, nanofabrication and semiconductor navigation equipment, Dr. Mirwais Aktary is the Canadian representative for Raith (also CEO of Applied Nanotools Inc. p.12), ma@raithusa.com, 780.432.5866



Xerox scientist at work. Photo credit: Xerox

Xerox Research Centre of Canada

Xerox has been doing nano-enabled research for several years now, and already has nano-enabled products on the market. In Alberta, Xerox has a research partnership with NINT in Edmonton (p.48) that will include research in organic electronic materials to bridge the gap between paper and electronic documents.

CONTACT: www.xerox.com/innovation, Mississauga, Ontario, document solutions, Dr. Hadi Mahabadi, VP and Centre Director, hadi.mahabadi@xrcc.xerox.com, 905.823.7091

Sun Microsystems of Canada

Sun Microsystems has supported the **Centre of Excellence in Integrated Nanotools (CEIN)** (p.43) at the **University of Alberta** (p.43) in Edmonton with a cash donation of \$250,000 and an in-kind contribution of \$2.45 million in hardware, software, and storage systems and services.

CONTACT: <http://ca.sun.com>, Markham, Ontario, IT Infrastructure, Angela Kouritzin, Client Executive, angela.kouritzin@sun.com, 780.429.9586