

LINK

Moving
Life
Sciences
Forward



PRECISION BIOLOGIC

Celebrates 25 Years of Success with
its Core Product Line CRYOcheck™



DENSITAS
Developing Meaningful
Data-Driven Healthcare
Products for the
Mammography Enterprise

BIOPORT 2017
SAVE THE DATE

A Message from BioNova's **MANAGING DIRECTOR**

To our readers,

The new year is always a time of reflection on the past year and of the endeavours that await in the upcoming year. As I reflect on the life sciences sector in 2016, it is hard not to be proud of all the accomplishments. From Nature's Way Canada's decision to make Halifax its Canadian headquarters to a brand-new start-up, Appili Therapeutics raising \$3.2 million dollars in seed funding and all the other success stories in between.



BioNova also saw significant changes and growth in 2016 with the implementation of its Growth Plan, new branding and adding to its team to better serve its members. However, it will not stop there. We have assembled a stellar team of industry professionals who have been working tirelessly to help identify areas of opportunity to develop a Sector Growth

Strategy that will provide the direction and further initiatives to build on successes to date, ensuring our improved prosperity.

I recently sat in on a roundtable to discuss the Atlantic Growth Strategy which focuses on creating a vibrant economy for Atlantic Canadians, with regional MPs and leaders from various sectors. I was pleased to be the voice for the life sciences and our oceans connections because as you've probably heard me say before: the life sciences are moving along the path to be a supporting pillar of the region's new economy. This is a position we, at BioNova, firmly believe in and are actively leading.

I am looking forward to all the successes we will surely see in 2017 so, I encourage you to get engaged and follow us on social media to stay up to date on all the latest news in the sector. I hope you enjoy this issue of LINK and learn about the innovative work being done in our province that will not only benefit you but our economy.

All the best,
Scott Moffitt

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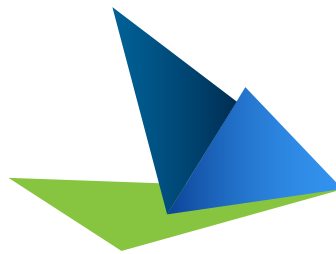
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PRECISION BIOLOGIC

Celebrates 25 Years of Success with its Core Product Line CRYOcheck™

Founded in 1983, Precision BioLogic (formerly Precision Biologicals) originally developed conventional diagnostic coagulation products that were sold in Atlantic Canada and some markets overseas. The company had limited success, however, because its products had few distinct advantages over other products on the market.

In 1991, with support from one of the company's shareholders, Michael Scott, Precision BioLogic began to revitalize itself. By approaching existing and new customers for input, they were able to develop products that offered unique value. This method proved to be valuable for Precision BioLogic, and it has grown into a leader in Nova Scotia's life sciences sector. Like most success stories, this change did not happen overnight. Entering the diagnostics market is no easy task regardless of where you are located due to exacting regulatory requirements, but with a mix of strong leadership, customer listening, and a supportive corporate culture, Precision BioLogic will be marking 25 years of success with its core product line, CRYOcheck™, this year.

CRYOcheck frozen products are used to diagnose blood clotting disorders with several significant advantages compared to competitors' products. Conventional freeze-dried products require reconstitution – a 30-to-40 minute process that introduces the possibility of preparation errors. CRYOcheck can be ready in three to five minutes.

"When a patient requires emergency care or surgery and a physician needs to test for clotting disorders – time is of the essence. Our product can deliver results in minutes, saving the doctor and patient valuable time," says Paul Empey, President and CEO of Precision BioLogic.

Through customer feedback, Precision BioLogic discovered that freezing plasma products improved clarity, stability, accuracy and decreased the threat of inaccuracies. The concept for the first CRYOcheck product was developed in close collaboration with a pilot group of 13 hospitals across Canada and was officially launched in Canada in 1992. It received FDA clearance in the United States less than a year later.



Handling and shipping these products does not come without its challenges. Precision BioLogic prides itself on customer listening and providing the best service possible, which includes shipping its products overnight on dry ice to avoid thawing, colour coding its products, providing several tools to assist in storage, thawing and preparation and contacting customers to ensure the safe arrival of its products.

"Precision BioLogic has been successful because we pride ourselves on customer listening. The customers steer us in the direction we need to go with our products, and we deliver," explains Empey.

In addition to celebrating 25 years of success, last year Precision BioLogic was the first IVD diagnostics manufacturer to donate product through the World Federation of Hemophilia (WFH) Humanitarian Aid Program. The donation provided much-needed calibrators, controls and reagents to the University Teaching Hospital in Yaoundé, Cameroon. The donation was an important first step in the effort to improve and sustain care for people with bleeding disorders such as hemophilia, and Precision BioLogic plans to continue its support with the WFH to improve the care in third world countries.

"We are working with the World Federation of Hemophilia to enter into a multi-year relationship to continue and expand our donations to countries that need our diagnostics," says Empey. "We are very excited about this relationship because helping others is important to us at Precision BioLogic."

All the success and excitement has not distracted Empey, who was appointed President and CEO in November 2016, from strategizing about the company's future growth.

"Moving forward, the key areas I would like to see Precision BioLogic expand on would be entering partnerships – largely in

"My vision moving forward is to create a collaborative community in Nova Scotia, so the rest of Canada and the world know that there is a spot in Atlantic Canada that's growing and excelling in the development of life sciences."

- Paul Empey, President and CEO of Precision BioLogic

the pharmaceutical industry. I would also like to see us get back to our roots in product and research development; we have plans to initiate a process to which we are hoping to get a new product into the pipeline each year."

Lastly, Empey, a Massachusetts native who now calls Nova Scotia home, makes a call to the life sciences industry, "We have something special here, Michael Scott saw it; I see it. My vision moving forward is to create a collaborative community in Nova Scotia, so the rest of Canada and the world know that there is a spot in Atlantic Canada that's growing and excelling in the development of life sciences."

PrecisionBioLogic



DENSITAS

Developing Meaningful Data-Driven Healthcare Products for the Mammography Enterprise

Women with dense breasts are at five times increased risk of developing breast cancer than women with fatty breasts because dense breast tissue obscures underlying cancers that grow in this tissue, creating a masking effect that can make the images difficult to read for radiologists. Densitas, located in Halifax, is working to eliminate the subjectivity of reading these images and improve mammographic quality and health outcomes with its flagship product, DM-Density. DM-Density is a software application that can integrate into the existing hospital IT infrastructure seamlessly and will provide radiologists with standardized and reproducible breast density assessments that they can use when establishing individualized follow-up screening protocols. Tailored follow-up breast screening protocols have the potential to reduce healthcare costs, decrease false positives and improve health outcomes for women.

The founder and CEO of Densitas, Mohamed Abdoell, says that the current state of breast health care is viewed as a “one approach fits all,” which he says doesn’t work for several reasons due to the increased costs to the healthcare system and risks to patients the framework entails.

“As the healthcare system is rationalizing its limited resources, population-level screening is being scrutinized for clinical and cost effectiveness,” explains Abdoell. “Comprehensive breast screening programs are effective. The discourse is now focused on whether we can more effectively identify those who are at higher risk, so that we can screen these women more frequently, while those who are at lower risk do not have to be screened as aggressively, ultimately improving outcomes while saving time and money. This is important to ensure sustainability and access to quality healthcare.”

Nova Scotia’s Unique Comprehensive Approach

Nova Scotia provides a rare opportunity to develop innovative technologies such as the technology Densitas has developed for the mammography enterprise. The Nova Scotia Breast Screening Program (NSBSP) has repeatedly innovated, with a focus on improving quality and service delivery. A pillar of its success has been a unique home grown breast information system that allows the program to evaluate clinical outcomes and develop evidence-

based strategies for breast health care. The health of Nova Scotians is better for it. The availability of this kind of data is unusual. It provides the opportunity for Densitas to establish collaborative research agreements with researchers to rapidly prototype and validate new technologies with the women of Nova Scotia directly benefiting from these innovations.

“We are very fortunate to be able to collaborate with the Nova Scotia Breast Screening Program, the IWK and the Nova Scotia Health Authority,” says Abdoell. “The innovation agenda and the collaborative environment in Nova Scotia allows Densitas to develop and test technologies rapidly, accelerating our pathway to commercialization.”

The ability to link mammograms with clinical outcomes provides a unique opportunity for the application of big data analytics to tackle the big challenges in breast screening that relate to breast density, mammography quality and clinical workflow. This means that Densitas can develop unique technologies and validate them before going to market.

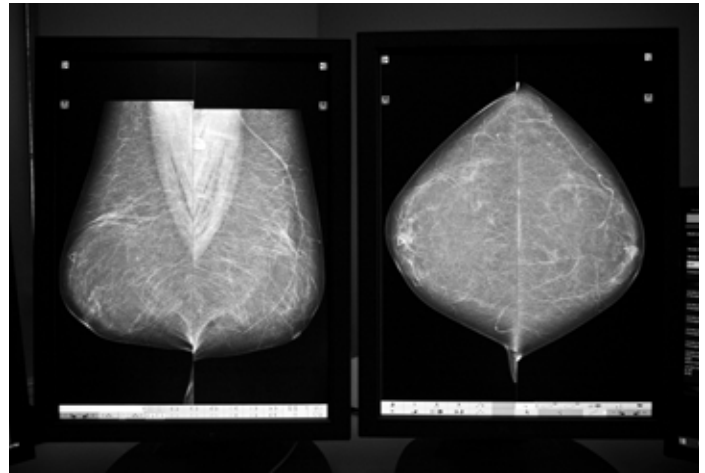
“In an environment that is moving from volume based to value based healthcare, it is important that new technologies can demonstrate improved health outcomes. This kind of health



Mohamed Abdoell, founder and CEO of Densitas

“We have attracted international interest in what we are doing, and that is partly due to the unique data holdings in Nova Scotia and partly as a function of this ecosystem here. You can’t underestimate the value of that. There aren’t many places that have this type of supportive infrastructure.”

- Mohamed Abdoell, founder and CEO of Densitas



technology assessment can only be done if the right data has been collected,” says Abdoell. “Historically, products have often been introduced into the market without such health technology assessment reviews. We are in an enviable position in Nova Scotia whereby we can validate our technologies first, which makes for improved health care outcomes as well as a more rapid path to market.”

The Support of an Innovative Ecosystem

Abdoell finds the company has also significantly benefited from the supportive funding ecosystem in Nova Scotia. He credits organizations such as the Atlantic Canada Opportunities Agency (ACOA), the National Research Council (NRC) Industrial Research Assistance Program, Innovacorp, BioNova, NSBI, Learnsphere, the Canadian Trade Commission, and others, not only for their assistance and counsel, but for providing a supportive infrastructure that attracts interest from investors and big players in the healthcare industry internationally.

“We have attracted international interest in what we are doing, and that is partly due to the unique data holdings in Nova Scotia and partly as a function of this ecosystem here,” explains Abdoell. “You can’t underestimate the value of that. There aren’t many places that have this type of supportive infrastructure.”

The company has also received international recognition from programs in Silicon Valley, Chicago, and Toronto. In early 2016 the company was selected to participate in Dose of the Valley, an exclusive workshop for some of Canada’s most promising

life sciences companies to engage with key US stakeholders. Densitas was also selected for a residency at Johnson & Johnson Innovation’s JLABS@Toronto, located at the MaRS Discovery District, which will allow them to participate in the medical technology innovation and commercialization network in Toronto. In February (2017) the company will head to Chicago to participate in the Canada-Chicago Mentoring Program (C2MP), which catalyzes technology commercialization opportunities in the Chicago area by matching experienced and supportive mentoring teams with early stage innovators who can help strategize entry into the US market.

“We just submitted our FDA 510K application, and we are looking forward to entering the US market, so our participation in C2MP is coming at a great time, and we are quite excited about that,” said Abdoell.

Abdoell and his team at Densitas are gearing up for a big year in 2017 with plans to enter the European and Canadian markets, and moving forward with US markets once it receives FDA clearance for its flagship product, DM-Density. Looking ahead, the team will continue to develop new technologies in their product pipeline.



HEADLINE HIGHLIGHTS

A wrap up of what's been happening in the life sciences industry



Athletigen Releases First Genomics App for Human Performance

Athletigen announced the closed release of Iris™, a first of its kind personalized performance genomics app suite in October, which merges an athlete's genetic predispositions with daily monitoring data, empowering coaches, and athletes with actionable insights to inform peak performance in training and competition.

Built specifically for high-performance athletes, Iris™ sits at the intersection of nature and nurture; where an athlete's genetic traits interface with their environment. After analyzing an athlete's DNA through a saliva sample, Athletigen reports on genetic markers related to nutrition, recovery and injury protection that can affect training adaptation and performance. Combining genetic insights with daily athlete monitoring of sleep, hunger, mood, training load and more, athletes and coaches are provided with a holistic view of human performance data.

Consisting of the Iris™ Athlete app and Iris™ Coach app, the software suite was built working closely with Olympic athletes and coaches at the ALTIS training center in Phoenix, AZ leading up to the Rio 2016 games. ALTIS athletes & coaches will be using Iris™ as Athletigen's official partner and pioneer of human performance research.

Iris™ is available to select high-performance organizations, with the expected release to the public later this year.



Precision BioLogic Appoints President and CEO

Precision BioLogic's Board of Directors announced in early December that they had appointed Paul Empey as President and CEO of the company. Empey joined Precision BioLogic in 2015 as the Executive Vice-President and brings with him more than 30 years of experience in senior and executive positions at several successful organizations including Ocean Nutrition Canada. Congrats, Paul!



Paul Empey



BioMedica Diagnostics Acquires Sekisui Diagnostics

BioMedica Diagnostics (BMD) made the announcement in December that it had purchased the specialty coagulation business and product line from Sekisui Diagnostics (SDG).

The agreement includes all aspects of the business worldwide, except for Europe, Middle East, and Africa, where SDGmbH, a Sekisui Diagnostics subsidiary, will continue to distribute and support the products in partnership with BMD. In conjunction with this agreement, BMD has also acquired the American Diagnostica trademark.



Neopeptide Peptides Formulated in Immunovaccine's DepoVax™ Vaccine Platform Show Significant Positive Results in Preclinical Studies

Immunovaccine Inc announced positive results from preclinical studies completed in collaboration with UConn Health for Immunovaccine's DPX-NEO program, which is designed to develop patient-specific neopeptide immunotherapies in December.

Results from the first study using neopeptide formulated with the DepoVax™ platform in mouse tumor models have shown positive anti-cancer activity. Researchers are preparing a manuscript for submission to a peer-reviewed journal and will release further data upon publication.

Epitopes are the part of the biological molecule that is the target of an immune response. Neopeptides are the mutated proteins produced by a patient's tumors. Neopeptide vaccines target these patient-specific proteins and have been called the next immunotherapy frontier.

Athletigen Releases First Genomics App for Human Performance

Precision BioLogic Appoints President and CEO

Appili Therapeutics Raises \$2.2M in Equity Capital to Develop Its Anti-Infective Pipeline

TruLeaf Closes \$8.5-million Round of Financing

In this preclinical program, researchers from UConn Health supplied multiple neoepitopes identified for their internal mouse tumor model to Immunovaccine. Immunovaccine formulated each of these peptides in its proprietary DepoVax™ platform and supplied the resulting vaccines to UConn Health. Researchers evaluated each vaccine for immunologic and anti-tumor activity.



Appili Therapeutics Raises \$2.2M in Equity Capital to Develop Its Anti-Infective Pipeline and Welcomes New Board Member

Appili Therapeutics Inc., an anti-infective drug development company, announced in late December that it had raised an additional \$2,151,000 in its over-subscribed private placement financing. Participants in this capital raise included current Appili investors such as Innovacorp, as well as new individual and institutional investors. Proceeds from the financing will be used to advance its lead product candidate, a taste-masked antibiotic designed to treat anaerobic infections like *Clostridium difficile*, into clinical trials. In addition, the company will advance the development of a novel class of antibiotics targeting drug-resistant Gram-negative bacteria and evaluate opportunities to add high potential anti-infective programs to its pipeline.

The company also announced in early January that it had appointed industry veteran, Steve Nicolle to its board of

directors. A seasoned executive, Mr. Nicolle has led companies to deliver innovative customer value and returned over \$100 million to their investors.



Athletigen Accepted in CDMD Soft Landing Program

Athletigen is one of 39 companies accepted into the Winter 2017 cohort of the Canadian Digital Media Network's Soft Landing Program. The program helps mature start-ups and small- to medium-size enterprises (SMEs) from across Canada to grow their businesses through new revenues or investments in foreign markets. Program participants receive access to office space for up to three months in their desired destination. Since 2012, CDMN has helped 387 Canadian companies expand internationally through this program, resulting in more than \$46.8 million in new revenue and more than \$41.9 million in investment opportunities.



Health QR CEO Receives Excellence Award

Patti Ryan, founder and CEO of Health QR was honoured with a Progress Women of Excellence Award from the Canadian Progress Club's Halifax Cornwallis chapter,

in November. Her company, Health QR is a health information technology company that develops medication management solutions that improve health outcomes. The company launched a mobile app in 2015 that helps people manage their medications through a secure connection to participating pharmacies.



TruLeaf Closes \$8.5-million Round of Financing and Welcomes New Board Members

TruLeaf Sustainable Agriculture Ltd closed an \$8.5-million equity-finance round in December. The funding will enable the company to continue its mission of becoming a global leader in vertical farming technology. TruLeaf develops sustainable farming systems that can be built anywhere that enable fresh, nutrient-dense, pesticide-free produce to be grown locally all year round.

Mike Durland, Former CEO and Group Head of Scotiabank's Global Banking and Markets division led this funding round along with a small group of strategic investors from Toronto. In addition, Mr. Durland and Neil Murdoch, Former CEO of Connor, Clark & Lunn Capital Markets, have become members of TruLeaf's Board of Directors.

START-UP SPOTLIGHT

MacKenzie Healthcare Technologies Revolutionizing the way people are repositioned in wheelchairs in homes, hospitals and care facilities around the world

Nova Scotians working in the healthcare sector have the highest rate of workplace injury compared to any other industry, with musculoskeletal injuries to healthcare workers costing Nova Scotia taxpayers \$100 million annually. These injuries are frequently caused by continuing care workers repositioning patients in wheelchairs who are unable to reposition themselves.

MacKenzie Healthcare Technologies, in collaboration with NSCC and Northwood, a leading long-term care facility in Halifax, has developed The Paraglide system to help alleviate this problem. Paraglide is a wheelchair repositioning system that brings mechanical innovation to the currently injury-prone and undignified task of moving someone in a wheelchair from a slouched position to an upright position.

The Paraglide device will be the first of its kind that will allow people who become slouched forward in wheelchairs to reposition themselves at the touch of a button, removing the reliance of a caregiver and giving them dignity and independence. The device will also eliminate the risk of caregiver injury for this task, prevent pressure injuries (bed sores), and save resources in healthcare facilities, nursing homes, homecare, governments and injury-related insurance coverage for both wheelchair users and caregivers alike.

Paraglide, made of lightweight aluminum, contains a motor, gears, and electronics which attach to the back of the wheelchair. The device uses a wireless remote control, rotating and pulling a specially designed fabric sheet along the seat of the wheelchair thereby moving the person automatically. When the button is released the device releases the sheet, allowing enough slack for the individual to make their way forward again, allowing free movement.

Last October, MacKenzie Healthcare Technologies was named the winner of the sixth annual BioInnovation Challenge (presented by BioNova), chosen by a panel of judges for its adaptability, market pull, and consumer readiness. The prize package valued at more than \$30,000 contained a seed investment and a package of advisory services that the company has used to advance its production as it prepares for the market this summer.



GET INSPIRED - by what's happening in Nova Scotia's life sciences start-up community

Emagix

Working to Improve Diagnosis and Treatment for Patients with Diabetic Retinopathy

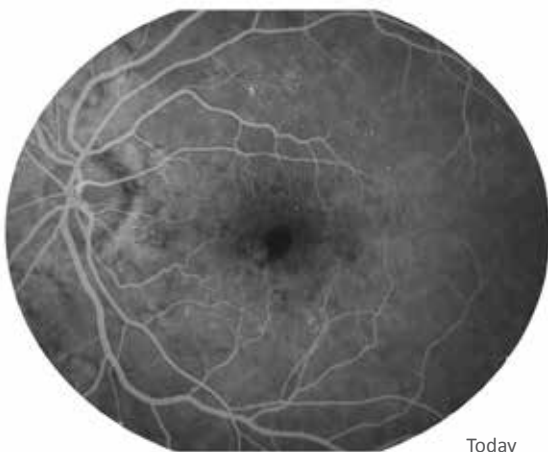
Nearly 90 percent of people living with diabetes will eventually go blind. Diabetic retinopathy is caused by diseased vessels in the retina leaking blood components or hemorrhaging. The effects increasingly distort vision because of scarring of the retina and, in its most advanced stage, leads to blindness. The damage is irreparable – increasing the importance of early diagnosis.

The current diagnostic procedure is Fluorescein Angiography, a standard eye test performed by an ophthalmologist, who uses a special dye and camera to look at blood flow in the retina. The ophthalmologist visually reads the images and provides a diagnosis based on qualitative analysis. The founder of Emagix, Dr. Alon Friedman together with his team, developed software that reduces the testing time while enhancing the current images and providing results that enable a quantitative analysis. The software uses an algorithm that processes multiple images to produce a single, finer grain image, which makes previously imperceptible leaks from tiny capillaries as noticeable as much larger leaks from bigger vessels. In short, this innovation promises to reduce

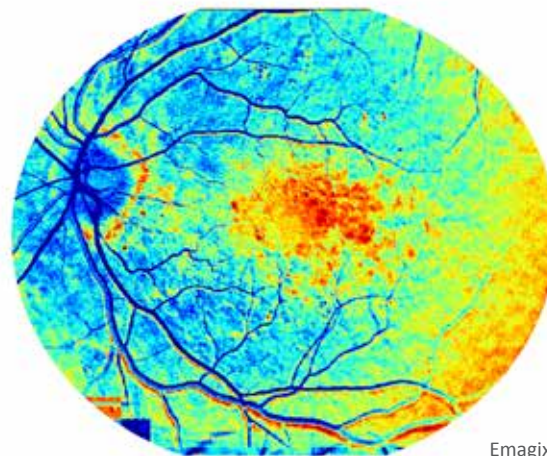
the subjectivity involved in reading the test results dramatically. Additionally, this process will enable much more precise and objective analysis of treatment effectiveness.

Dr. Friedman moved his research to Dalhousie University from Ben-Gurion University in Israel in 2014 after being attracted to the university and the province of Nova Scotia because of its business community and provincial support from organizations such as ACOA, Innovacorp and BioNova. The gain was also a big one for Dalhousie, Dr. Friedman is one of the top researchers globally in his field and has received over \$9 million in research funding over the past decade.

The software can be integrated into existing equipment and will provide ophthalmologists with much more valuable data that promises to significantly improve diagnosis and treatment efficacy not only for patients at risk of diabetic retinopathy but also patients with Alzheimer's Disease, stroke, brain injuries and other diseases that are caused by leakage from blood vessels.



Today



Emagix

Emagix gives an accurate, detailed and quantitative information on retinal pathology that is not currently available.





BIONOVA BOOST

BIONOVA BOOST

We created this workshop series to accelerate the innovation and productivity of Nova Scotia's businesses while boosting the bioeconomy. We offer various business topics including intellectual property and patent system changes, marketing and communications, workforce enhancement and more. The sessions bring together BioNova members, business professionals, industry representatives, students and other key stakeholders.

BOOST YOUR BUSINESS

Informational seminars to boost your chances of achieving your business goals, such as accessing new sources of funding and emerging business needs.

Educational events to facilitate business development, such as Intellectual Property and Patent system changes, Marketing and Communications workshops to improve outreach and Talent Recruitment & Management training to enhance your workforce.

Industry related workshops to address known challenges and emerging issues, such as regulatory changes within the FDA & Health Canada, CE Marking and reimbursement strategies.

PARTNER WITH US

Our events offer a unique opportunity for your organization to connect with Atlantic Canada's life sciences industry and a wide variety of influencers from industry and research, government officials, investment community and healthcare. Sponsoring one of our workshops can provide your organization with an opportunity to build or reinforce strategic relationships, brand awareness and demonstrate your support for life sciences in Atlantic Canada.

Visit our Events page at BioNova.ca to register for our upcoming BioNova Boost events

*BioNova Members attend for free, all non-members attend at discounted rates