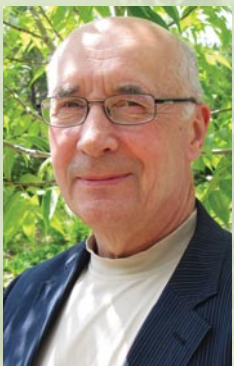




growing**TOGETHER**
Ag-West Bio 2011-2012 Annual Report

president's MESSAGE

We find ourselves in a world experiencing rapid technological advances driven by bioscience discoveries. These advances benefit us in many ways: more accurate methods for detecting diseases, nutritionally superior foods and environmentally-friendly products, to name a few.



Our world is also facing substantial global challenges: the challenge of producing enough food, under changing climate conditions, for a population exceeding nine billion by 2040; effectively managing diminishing fresh water reserves; and improving the quality of our air, water and soil. With these challenges, we see opportunity for Saskatchewan to emerge as a leader in providing safe, high-quality food, produced efficiently in an environmentally sustainable manner. To be competitive, it is essential that Saskatchewan strengthen its research capacity in the biosciences. Ag-West Bio has long been an advocate for the development and application of biosciences and wherever possible, promoting socio-economic benefits through industry attraction and growth. We intend to be even more active in this role in the future.

Saskatchewan's role as an agri-food research and development powerhouse is bolstered by new developments in our bioscience cluster. VIDO, through the creation of the International Vaccine Centre (InterVac) is launching new research approaches to reduce animal and human disease. The Canadian Light Source, Canada's synchrotron, continues to expand its technical capacity. A new medical sciences research complex is nearing completion on the University of Saskatchewan (U of S) campus, offering opportunities for building stronger linkages between agricultural (food) and medical (health/nutrition) researchers. The Premier has publicly referred to the establishment of a Global Institute for Food Security at the U of S. We will work with the Government, the University and other partners in supporting this strategically important initiative.

Cereals, and particularly wheat, are receiving renewed attention in an attempt to increase their overall value. The National Research Council and its partners are committed to a major new flagship project on wheat improvement.

Saskatchewan possesses the capacity to develop environmentally-friendly biofuels and industrial products from crops, such as *Camelina sativa* and *Brassica carinata*, thereby providing new opportunities for producers to diversify, and for value-added processing for companies. Ag-West Bio is currently leading a project involving the economic analyses of these crops as sources of aviation fuel.

Sustained economic growth in Saskatchewan's agri-food sector is dependent on a vibrant private sector. We provide

mentoring, competitive intelligence services and funding to establish new viable companies, enhance the capacity of existing companies and attract new companies, with the goal of building a competitive cluster. In our highly competitive world it is essential to establish a spirit of collaboration and partnership within and between the public and private sectors. Ag-West Bio seminars, industry showcases, workshops, conferences and networking events help create the environment for establishing such partnerships.

With input from our Board, we are revising our strategic plan to renew our funding agreement with the Saskatchewan Ministry of Agriculture. We look forward to working with our members and stakeholders and with the Government of Saskatchewan to generate economic and social wealth for the province.

I wish to thank our dedicated staff members, who strive to achieve the ambitious goals we set. Thanks also to our committed Directors who volunteer time, energy and expertise in guiding our organization; I especially wish to acknowledge the excellent service provided by outgoing Directors, Susan Milburn and Barb Stefanyshyn-Coté. We remain most grateful to the province for its generous support through the Ministry of Agriculture.

A handwritten signature in green ink, which appears to read "Wilf Keller". The signature is fluid and cursive, written over a light green background.

Wilf Keller

a letter from **THE CHAIR**

If you have ever toured the Saskatchewan Legislative Assembly in our province's capital, one thing that strikes you is the sheer size of the place. If you ask the tour guide why it was built so large, the answer is, "At the time, the government was predicting a population in Saskatchewan of 10 million."

Obviously, we aren't there yet. However, in the last few years, that enthusiasm has been renewed. The province is experiencing growth like we haven't seen before and the optimism is palpable.

In the biosciences sector, growth has been steady since the '80s at both public and private levels. Today, the demand for "green" technologies – from crop and animal health, natural health products and pharmaceuticals, to biofuels – is opening exciting new opportunities. As well, computer technology is allowing research to progress at a rate never seen before and information to move at an astounding pace.

This is an exciting time to be involved in biosciences. Ag-West Bio is at the epicentre of activity in Saskatchewan. Recently, Ag-West has been busy with the important business of strategic planning – choosing what the focus should be over the next few years.

Agbiotech activity has always been an area of strength in Saskatchewan. There has been growth in the health sector, as well as bio-based solutions for industry clean-up. Supporting the Ministry of Agriculture's efforts to promote agriculture awareness will mean a greater focus on outreach

activities. Corporate development and commercialization are priority areas to which we remain committed. Helping startup companies develop solid foundations through mentoring, business planning advice and funding is a key role that results in more companies dedicated to Saskatchewan's growth and prosperity. Over the past year, we invested in three companies, providing them with capital for research and business development and allowing them to leverage funds.

Ag-West continues to play an important role in building Saskatchewan's bioscience cluster – bringing together stakeholders from around the province and beyond, both virtually through the worldwide web, and physically, by hosting conferences and seminars, encouraging networking and the exchange of information and ideas.

At Ag-West Bio, members and stakeholders are always top-of-mind. The staff is dedicated to quality, whether it entails managing corporate development projects, organizing networking events, advising companies with business planning, or managing the website. I would like to thank them for their hard work and enthusiasm.

To my colleagues on the Board, all of whom offer a significant amount of volunteer time to ensure Ag-West is moving in the right direction, I appreciate your expertise and dedication.

And of course, we are most grateful to the Ministry of Agriculture for continued financial support that allows Ag-West Bio to grow biobusiness in this great province.



A handwritten signature in green ink, appearing to read "Brent Zettl". The signature is fluid and stylized, with a long horizontal line extending to the right.

Brent Zettl

Vision: Saskatchewan's catalyst for leading Canada's foremost bio-economy.

Mission Statement: Accelerating innovation and enabling companies to commercialize research.

Mandate: To provide leadership, as a catalyst, to link existing capabilities and resources in order to strengthen the bio economy industry in Saskatchewan.

Ag-West Bio Staff

President & CEO: Wilf Keller

Director of Corporate Initiatives: Mike Cey

Manager, Finance and Administration: Boni Dorish

Director of Commercialization: Brad Bly

Commercialization Project Manager: Monika Polewicz

Communications Director: Jackie Robin

Events Assistant: Brianna Hudson

Research Analyst: Allison Sigstad

Manager of Events: Nicola Adams

Executive Assistant: Lana Mollard

Ag-West Bio Board of Directors

Chair: Brent Zettl – Prairie Plant Systems Inc.

Vice Chair: Peter Phillips – U of S Johnson Shoyama Graduate School of Public Policy

Abdul Jalil – Saskatchewan Ministry of Agriculture

Brian Rosnagel – Researcher, U of S Crop Development Centre

Jerome Konecsni – Innovation Saskatchewan

Steven Fabijanski – Agrisoma Biosciences Inc.

David Gauthier – Genome Prairie

Outgoing directors:

Susan Milburn – Raymond James Ltd.

Barb Stefanyshyn-Coté – Tierra del Sol

industry overview

BUILDING ON FIRM FOUNDATIONS



Change and uncertainty are a reality these days, but in the case of Saskatchewan biosciences, the only uncertainty is whether we can grow fast enough to take full advantage of the potential opportunities. Government organizations, research labs and industry are working together ever more closely to build on our foundations. They are filling gaps, solving problems, and positioning the entire sector as competitively as possible in a rapidly changing world.

A shift in federal government priorities poses great potential for bioscience research. Roman Szumski, Vice President for Life Sciences at the National Research Council in Ottawa explains that the NRC is refocusing into a unified and industry-driven organization, addressing areas of national importance. “We are strengthening areas where we can make meaningful contributions, have a measurable impact and a positive return on our investment. We have confidence that we know how to do that because we’ve done it before with our research partnerships on canola,” he says.

The NRC is rolling out a series of flagship projects to focus on solving specific problems in industry. NRC’s lab in Saskatoon will take the lead on a wheat flagship, with the goal of accelerating the development of wheat



Faculty at the U of S College of Agriculture and Bioresources are committed to providing an exceptional learning experience by inspiring students and preparing graduates for leadership in the bioeconomy.

varieties to create more profitable wheat crops for farmers. Another flagship will involve the development of industrial biomaterials for automotive construction industries.

“The common theme in all of our flagship projects is to create a sustainable advantage compared to international competitors. We are building on Canada’s natural strengths to create critical mass in our areas of expertise.”

At a provincial level, Innovation Saskatchewan has identified that Saskatchewan has an abundance of resources that are in line with what the world needs: more food and more energy. “We need to develop these resources in a cost-effective and sustainable manner,” says Jerome Konecsni, CEO of Innovation

Saskatchewan. In response, the Saskatchewan Government has begun plans for a Global Institute for Food Security. The bioscience industry will be at the forefront of the project.

Konecsni identifies some gaps that still need to be addressed: “We need to build our skill levels in marketing new products and ingredients, as well as management of biotech companies. We need more companies that create value-added products. Companies thrive here, thanks to the research

**WE SHARE
OUR STORY**
with others and
help develop
relationships to
**ADVANCE OUR
ECONOMY**

infrastructure, including the national labs, Ag-West Bio, Canadian Light Source (CLS), and the university.”

Wilf Keller, President and CEO of Ag-West Bio, agrees: “In the long term, we need ten times more companies than we have now. A short term goal would be to at least double the number of companies in livestock, crops, green technologies and health care.”

Building Capacity

New companies need investment and infrastructure, and there is increasing availability for both. This year, funding to the NRC Industrial Research Assistance Program (NRC-IRAP) was effectively doubled, which is significant to startup companies, and translates to bioscience research opportunities.

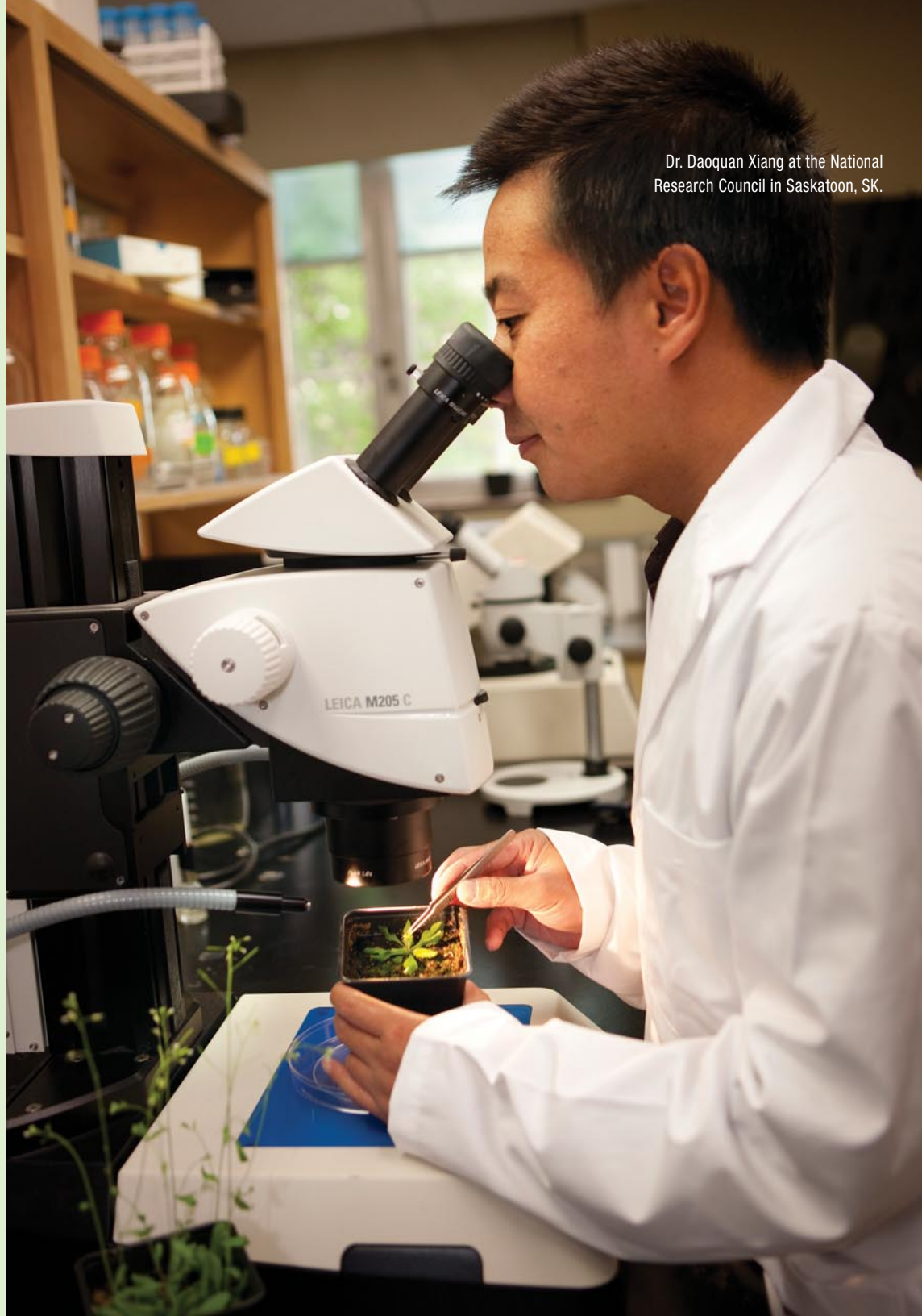
Innovation Place plays an important role in helping startup businesses succeed. Doug Tastad, CEO of Innovation Place, says, “We do everything we can to support startup companies. We welcome any smart technical people, in any industry, and there are some amazing crossovers. Our biggest clusters are biosciences and mining technology.”

Tastad cites the labs, greenhouses and controlled growth chambers at the biotechnology complex, and the Bio Processing Centre as examples of Innovation Place’s commitment to providing infrastructure to industry. “We try to react to industry needs as soon as possible.”

The wealth of experience that exists in the bioscience cluster is another crucial component to success. Paul McCaughey, Research and Development Director at Agriculture and Agri-Food Canada (AAFC), says, “We’ve evolved to the point where we complement each other. We support each other, rather than competing. For example, we are working on different aspects of improvements to canola; NRC has focused on genomics of abiotic stress resistance in canola, while AAFC has focused on brassica breeding and genomics of disease resistance. Two halves make a whole, so to speak.”

The one limiting factor that McCaughey sees is people: “We’re looking for the next ‘Cinderella crop,’ and we have a deep well of experience in this

Dr. Daoquan Xiang at the National Research Council in Saskatoon, SK.





Above: Dr. Alison Ferrie examining plants in the sunroom at NRC.

Above right: Prime Minister Stephen Harper at the VIDO-InterVac Grand Opening in September, 2011.

kind of research. But we need our scientists to transfer that knowledge to the next generation of researchers, before they retire.”

The University of Saskatchewan is doing its part to furnish the industry with experienced researchers. Mary Buhr, Dean of Agriculture and Bioresources, says enrolment at the university is up, and enrolment in the College of Agriculture and Bioresources is growing fastest. “We have way more jobs than we can fill with our graduates.”

Buhr identifies a potential opportunity to work with industries to build capacity for management skills within their existing employee base. “We need to take experienced undergraduates and retrain them to the next level, perhaps an Agriculture grad comes back to get a business degree, or a Biology grad comes back to do a Master’s in plant genetics.”

The global economic climate may also be a positive opportunity for the province, she says. “Saskatchewan is uniquely placed to take advantage



of weak job markets in other regions. We are one of the few locations in the world that hasn’t suffered a major recession. We have a fabulous opportunity to attract employees of superior calibre from other countries.”

Meeting a Global Challenge

There are global issues surrounding food, health and energy that will benefit from biosciences research in Saskatchewan, both at a fundamental and applied level.

Wilf Keller notes that technology is changing rapidly. “There is a whole range of opportunities as we move into the genomics era, beyond 2012. In Canada, and especially Saskatchewan, we need to be at the forefront of not only adopting these innovations, but in developing them. We need to continue to make improvements, not only in volume of production, but in improved quality and value.”

“The plant is a factory that makes an array of components. We need to understand those components and how they are made, learn how to extract them or modify them to better suit our needs, and apply them for different uses.”

Jerome Konecsni agrees. “Our investment in genomics, diagnostics and bio-informatics needs to be taken to a whole new level. We need new imaging processes to create a more targeted approach to strain development. We are looking for positive outcomes, and curiosity-based and discovery research is a critical component of that.”

AAFC will be using its expertise and partnering with other members of the bioscience sector on brassica research to explore new crops, such as *Camelina sativa* and *Brassica carinata*, which have potential for use in biojet fuel. “There is potential for significant acreage in the province to be devoted to new brassicas, very quickly,” says McCaughey.

The U of S has several projects underway that support global issues of food security and improvement of local economies. Researchers are bio-fortifying pulse crops with trace minerals to improve nutrition in developing countries. They have also developed a fast-growing willow tree that can be harvested annually, which may provide a cash crop for Saskatchewan’s northern regions.

Buhr summarizes the challenges and opportunities in the sector: “We need to be able to produce more bioproducts from sustainable resources that adapt quickly, at greater production levels, in a climate we can’t predict. In short, we need to use fewer resources, to produce more usable materials, more efficiently, everywhere.”

More is the order of the day: more companies, more collaboration across the Prairies, more mentors, more managers. We need to generate ideas and grow companies that translate those ideas into competitive products and services. We need what Keller refers to as “competitive intelligence,”



the ability to know what is available and where to find solutions.

In the next five years, the research and business communities will be pulling together even further in order to stay competitive on genomics research, knowledge generation and creating an environment for commercialization. Keller concludes, “The combination of knowledge generation and business development is our ‘one-two punch’.” ■

Above: An operator makes an inline process adjustment during a pilot process at POS Bio-Sciences.

Commercialization: Success AND COLLABORATION

by Brad Bly, Director of Commercialization



Right: Brad Bly hands a cheque to Jason Tratch, CEO of EcoLibra Systems. EcoLibra is one of three companies that received funding from Ag-West Bio in the past year.

Saskatchewan success

Ag-West Bio is privileged to work with numerous, growing bioscience companies as they strive toward achieving their commercialization goals. We are continually impressed with the ingenuity and determination of these companies.

Ag-West Bio's role is to facilitate the growth of these rising stars by providing input and linkages to resources and, when appropriate, leveraged investment via the AWB Technology Commercialization Fund. AWB has managed and operated a bioscience technology commercialization investment fund for over 20 years. We have made and managed investments in 65 different projects, involving 51 different companies, with approximately \$12 million invested. Philom Bios (now Novozymes BioAg), MicroBio Rhizogen, Bioriginal Food & Science Corp, Saskatoon Colostrum, MCN Bioproducts, Phenomenome Discoveries, Quantum Genetix, MPT Mustard Products and Technologies and EcoLibra Systems are examples of some of the companies that have benefited from these investments.

We do not highlight the success stories as much as we should. Although our sector is growing vibrantly, confidentiality restrictions often prevent

us from disclosing the success stories. Other times it is difficult to put success stories involving significant company evolution into a readily understood summary—but I will attempt this now. One of AWB's first investments was in Philom Bios Inc. Many are familiar with Novozymes acquisition of Philom Bios and the tremendous number of high quality jobs generated in Saskatchewan because of this success story, not to mention the innovative bioproducts, used by agricultural producers world-wide that maintain substantial market presence. I also want to highlight some other recent success stories:

AWB's role is to facilitate
GROWTH OF THE RISING STARS



- MCN Bioproducts (2000 AWB investee) was recently substantially purchased by Bunge Limited, a leading global agribusiness and food company. MCN successfully moved its innovative processing concept of manufacturing value-added canola-based ingredients for the aquaculture and animal feed industries from invention to commercialization. MCN's process and products add significant value to canola meal.

- Phenomenome Discoveries Inc. (2001 AWB investee) recently announced a commercial licensing agreement with Polymedco Cancer Diagnostic Products LLC for the US market, providing rights to Polymedco to commercialize Phenomenome's diagnostic blood test that assesses an individual's risk of colorectal cancer. This follows Phenomenome's successful clinical trial in Saskatchewan for the test. Phenomenome has grown from a few employees in 2001 to more than 30 today.

- Agrisoma Biosciences Inc. (2003 AWB investee) recently announced its partnership with Paterson Grain for the commercial contracting and distribution of carinata, the energy feedstock crop Agrisoma is

commercializing as a sustainable source of biojet fuel. Agrisoma's carinata bio-oil was also recently used in Canada's first biofuel-powered commercial flight. This represents a new production option for SK producers and significant traction for the use of a Saskatchewan developed and Saskatchewan grown crop for aviation fuel.

- Heads Up Plant Protectants Inc. (2003 AWB investee) has licensed its innovative natural seed treatment technology to Bayer CropScience LP. The Heads Up technology represents a proven seed treatment solution that can safeguard crops and increase yields.

- MPT Mustard Products and Technologies Inc. (2010 AWB investee) has moved into its new production facility in Saskatoon and recently passed regulatory approval in Canada for its biological fertilizer technology. MPT products represent new biological alternatives in high-value crop markets, along with a new, non-food market outlet for Saskatchewan-grown mustard.

These are just some of the recent successes witnessed in our industry. Many other companies are making significant strides. AWB wishes to congratulate these – and all SK companies – that hit their planned commercialization milestones. We realize that milestones changed over time as you evolved, often with compromise, and often based on seizing opportunities – but you hit them nonetheless. We are glad to have been part of your journey.

Working together

Ag-West Bio's input and investment is only one component of the successful formula developed by these companies. Our role is to leverage our investment effectively with other stakeholders. By working together toward building the industry, we are able to provide maximum benefit. We have great respect for the ability of the companies we work with. We facilitate linkages and input, but successful entrepreneurs work magic in knitting together the pieces that help accelerate their growth. Confidentiality restrictions prevent me from disclosing details; however, I wish to acknowledge the following stakeholders for their collaboration with AWB in assisting companies this past year:

SpringBoard West Innovations (with a special thanks to Lisette Mascarenhas for her pro-active initiative); Enterprise Saskatchewan (now Ministry of the Economy) (with a special thanks to Ron Kehrig for his insights and expertise); Communities of Tomorrow; Community Futures; University of Saskatchewan Industry Liaison Office; National Research Council (NRC-IRAP); Saskatchewan Research Council; Raj Manek Business Mentorship Program; Agriculture Council of Saskatchewan; and Agriculture and Agri-Food Canada. These stakeholders provide unique expertise and ability, but there is a common thread: Like Ag-West Bio, their goal is promoting commercialization and assisting innovative Saskatchewan companies along their journey toward success. ■

Growing our **BIO-COMMUNITY**

To be given the opportunity to help grow the Saskatchewan bioscience economy is both humbling and immensely rewarding. Supporting Saskatchewan entrepreneurs with great ideas, technologies and a vision for growth is the best job in the world.

An important Ag-West Bio initiative this year was an economic feasibility study of camelina and carinata oilseed as feedstock to produce biojet fuel and related bioproducts. Both crops will likely become an important part of this emerging value-added sector, thanks to R&D advances being made here. Working with commercial partners such as Agrisoma Biosciences, Linnaeus Plant Sciences and WestJet, we see that this industry, while still in its infancy, holds great promise to drive the agriculture economy in coming years.



Relationship building - connecting people and institutions within our cluster to those we wish to attract - is fundamental to our efforts. Working with Saskatoon Regional Economic Development Authority (SREDA), Canadian Light Source, POS Bio-Sciences, National Research Council, VIDO-InterVac, the University of Saskatchewan, Department of Foreign Affairs and International Trade (DFAIT) Saskatchewan's Ministry of Agriculture, Agriculture & Agri-Food Canada, Enterprise Saskatchewan (now the Ministry of the Economy), Innovation Saskatchewan and a host of others, continues

to lead to significant opportunities.

Our efforts to engage both large anchor companies and new small and medium enterprises as members of our association has been rewarding. We have also forged relationships with the Life Science Association of Manitoba, the Missouri Biotechnology Association (MOBIO), the Ontario BioAuto Council and others.

We have represented our members through submissions to government on the Federal review of support for Research and Development and the development of an Angel tax credit incentive program for the province of Saskatchewan.

As Ag-West Bio approaches its 25th year, we are in the midst of developing a five year strategic plan (2013-18) that will nurture our already successful life science sector. ■

Mike Cey, Director of Corporate Initiatives

Promoting the Saskatoon Super-Fruit

PRAIRIE BERRIES



The Saskatoon berry, native to the Canadian prairies, generates fond memories of tasty pies and other sweet treats for most Saskatchewan residents, but is not so well known outside of the prairies. Sandra Purdy, president of Prairie Berries, is working to create new and unique markets for Saskatchewan's favourite berry. Also president of the Saskatoon Berry Council of Canada, Purdy works with a wide-spread network of growers to promote the berry and market the products.

Trained in Business Administration and Project Management (she enjoyed a 25 year career with SaskTel), Purdy wasn't always a farm girl – but she married a farmer. In 1993 she and her husband Ken decided to diversify the family grain farm, located about 45 km from Moose Jaw, SK, near the hamlet of Keeler. After seeing a documentary on a Saskatoon berry operation and researching the nutrition and health benefits of the berry, Purdy's interest was piqued. "I'm kind of a health fanatic myself; I believe we are what

we eat. I got interested in that perspective." They began with a 10 acre orchard and by 2006 they completely moved away from grain farming to focus on the Saskatoon berry business. Today, the orchard has grown to 130 acres.

Purdy saw potential for the antioxidant-rich Saskatoon berry to be marketed as a super-fruit. "There has been a lot of trending information that shows there is an opportunity for super-fruits, in particular the blueberry, pomegranate and mangosteen. So we said, 'how would our berries compare to those three that are at the top?'" Purdy searched through the literature,

interviewed experts in the field and conducted her own research. She found that Saskatoon berries score higher than the top three fruits in most categories, including polyphenols and anthocyanins, (which are both antioxidants) and fibre content.

Rather than enter the common berry marketplace of jellies and pies, Purdy took Prairie Berries in a different direction, finding a niche in the ingredients market. "Saskatoon berry concentrate can be used in the beverage industry for making juices; it can also be used in the smoothie industry. The dried Saskatoon berries can be used in products like fruit bars and granola mixes. We're just trying to get outside the typical jam and jelly market."

The natural health product market is another target. "We believe the opportunity is high in functional foods. The high fibre and high levels of polyphenols and anthocyanins definitely fit that functional attribute." Purdy would like to see the berry make its way into the nutraceutical market. "Initial studies show there are properties within the seed oil that may serve as potential dietary source of tocopherols, sterols, and unsaturated fatty

Saskatoon berries score HIGHER than the top three fruits in most categories, including polyphenols, anthocyanins, and fibre content



acids. It will take more dollars and research to figure out which compounds to target.”

Like most young companies, financial obstacles are one of the major challenges faced by Prairie Berries. Limited product awareness for Saskatoon berries outside of Western Canada means market development costs are high, even with provincial programs like Saskatchewan Agri-Value Initiative (SAVI). Securing adequate funding has been difficult to promote the berry the way it needs to be to increase awareness. However, Purdy strongly believes in the health benefits of the Saskatoon berry and is optimistic that once this is realized, the industry will see more funding.

The geographical dispersion of growers poses infrastructure challenges that also increase the costs of handling. “With Saskatoon berries, we are geographically dispersed between Manitoba, Saskatchewan and Alberta, so making sure we have a cost-effective supply of the berries is a challenge for us.”

Despite the challenges, the Prairie Berries team is working hard to promote the Saskatoon berry industry and generate as much media exposure as possible, ranging from an appearance on CBC’s Dragon’s Den to participation in ingredient trade shows in the USA.

Brad Bly, Director of Commercialization at Ag-West Bio believes that by moving beyond pure food products to innovative market ideas, attracting partners to do the hi-tech processing and most of all, Purdy’s expertise, Prairie Berries will reach its goals. “Through integrity and research, they have become the experts nationwide. Sandra has really been the leader in all of this. She has an amazing ability to bring people together.”

Purdy is so optimistic about the future that she talks about her goals as if they’ve already been reached, predicting a rosy future for the industry: “We achieve a notable position in the functional food market in North America, we are successful in expanding the capacity of commercial



processing of fruit in Saskatchewan, and Saskatoon berries from Canada are the new crave for exotic berries.”

For more information about Prairie Berries, visit www.prairieberries.com ■

Ken and Sandra Purdy harvest the 2012 berry crop on their farm near Keeler, SK.

flying high on carinata

AGRISOMA BIOSCIENCES

Steven Fabijanski, President and CEO of Agrisoma Biosciences, says the question isn't why growers would use Canadian cropland for feedstock to make biofuels, but rather, why wouldn't they?

"There's really no downside to biofuels; it's just a matter of capturing all the upsides," he says. "As the renewable fuels industry grows and develops there are economic benefits that can accrue for the country, particularly in the rural economy: Better utilization of land, more farm profits, more industry infrastructure, jobs going into the rural economy and environmental benefits."

Agrisoma Biosciences, one of Canada's leading agbiotech companies, chose *Brassica carinata* (also known as Ethiopian mustard or simply, carinata) as the platform for a sustainable replacement for petroleum-based jet fuel. Agrisoma uses its patented Engineered Trait Loci (ETL) technology to optimize the agronomic profile of carinata for biofuel production. ETL technology efficiently stacks multiple traits into engineered plant chromosome structures, creating new and enhanced plants. Agrisoma employs around 20 people,

with offices in Ottawa and research laboratories at National Research Council (NRC) in Saskatoon. The background work on developing carinata into a robust plant form for renewable fuel was done by the breeders at Agriculture and Agri-Food Canada and most of the molecular biology studies were carried out at NRC. Agrisoma has launched commercial production of carinata under the trademark Resonance™ Energy Feedstock.

Fabijanski says carinata has a number of features that are important for the renewable fuels industry. "It has a very good oil profile; it makes a very good feedstock for the manufacturing of biofuels."

Carinata tolerates heat and drought well, meaning it can grow in semi-arid lands, such as in south-western Saskatchewan and south-eastern Alberta. Fabijanski says the company doesn't intend to displace any food production. In fact he believes the crop can actually add to overall food production because it works well into wheat rotation, which also benefits producers.

Agrisoma and other stakeholders recently joined in a project led by Ag-West Bio to study the production of biojet fuel as a viable industry in Saskatchewan. Mike Cey, Director of Corporate Initiatives at Ag-West Bio, is overseeing the project. "We see Agrisoma as one of the primary commercial champions getting the aviation biofuels industry started." Ag-West is planning to release the results of the study within the next six months and Cey says early results are promising. "As carinata's yield, oil content and oil profile are improved, it should become a feasible feedstock."

A real challenge for the biofuels industry has been to develop a process

biojet fuel
operates with
**IMPROVED
EFFICIENCY &
DRAMATICALLY
REDUCED
carbon
emissions**

for making biojet fuel that meets the specifications of conventional petroleum fuel. Fabijanski says, “For aviation to use renewable fuels, those fuels have to be identical in properties to the current jet fuel.”

Cey agrees: “The aviation industry says it has to be a drop-in solution. The planes and engines have to operate precisely the same for a bio-based product as they do for a petroleum product.” He notes that test flights have demonstrated that biojet fuel can do one better than that; not only do the engines operate the same, the studies have shown they operate with improved efficiency and dramatically reduced carbon emissions.

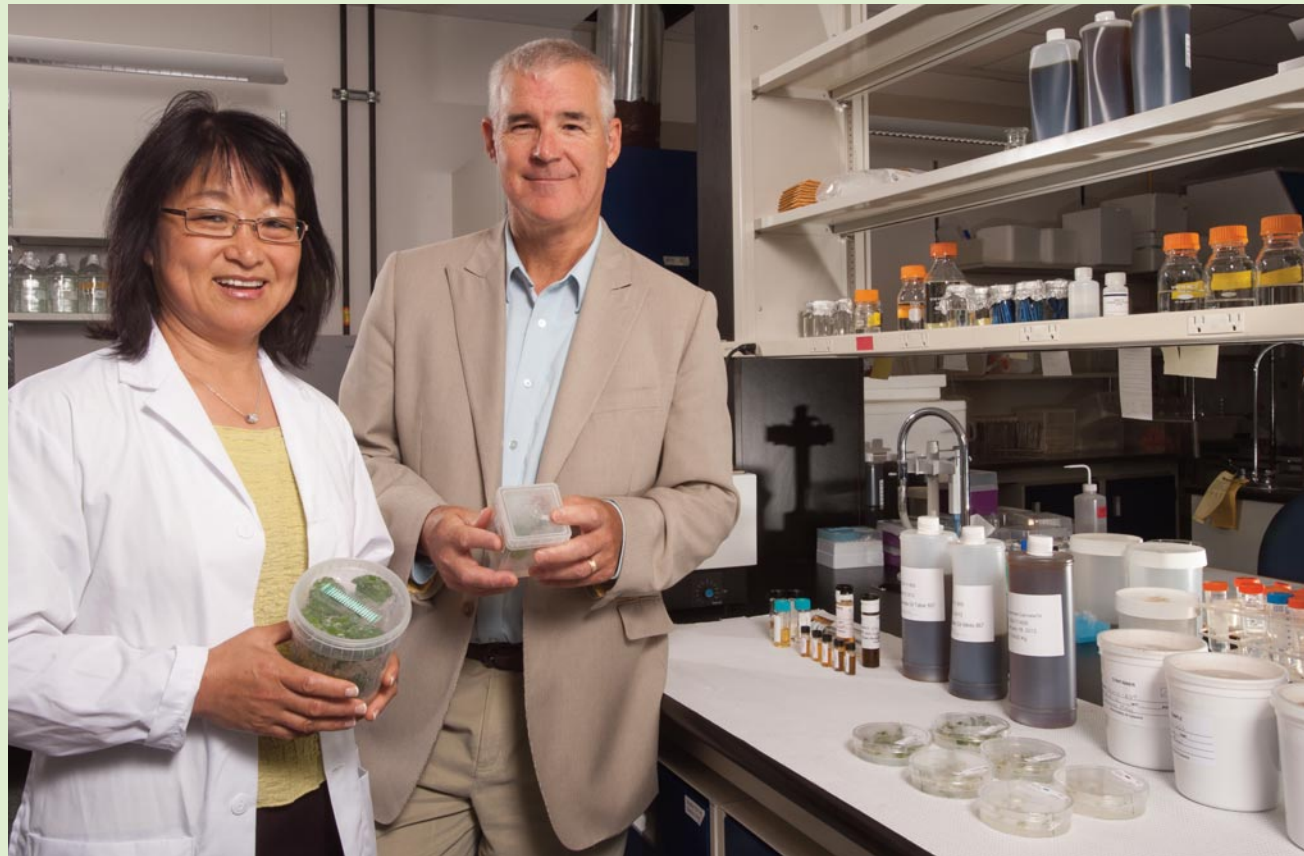
A number of technologies exist to turn carinata into biojet fuel. Agrisoma chose Honeywell UOP, an international company with an ASTM certified* process and the capacity needed to manufacture jet fuel from these oils. Agrisoma has also partnered with Applied Research Associates (ARA), which is using its CH Technology to produce drop-in jet and diesel fuels from carinata oil. Key partners on the production side are Mustard 21 Canada Inc. and Paterson Grain, which provides Agrisoma with the commercial expertise for contracting and logistics. Agrisoma has over 40 growers on more than 6000 acres across the brown soil zone regions of southern Saskatchewan and Alberta. Production fields range from 80 to 240 acres per site.

National security and the volatility of petroleum-based oil markets further build the case for biojet fuel. Fabijanski says there is strong government support south of the border for biofuels to lessen the reliance on petroleum from countries that are considered unfriendly. Fabijanski says the Canadian government has a mandated two percent biodiesel and five percent ethanol content in fuels and although the support for biofuel isn't as closely linked to national security, he believes Canada will change to support biofuels, along with everyone else in the world. “The aviation industry is certified to run up to 50 percent biofuel. That's 30 billion gallons globally, which translates into a very large amount of money.”

Fabijanski says the next step is to improve the economics of the crop—increasing the yield to a point where the finished product is close to petroleum-based prices. “That's a challenge for the entire industry. The industry is working in concert across competitive fronts to really build the infrastructure and capacity in order to drive prices down and build a strong and viable value chain around the renewable fuel industry.”

For more information visit www.agrisoma.com ■

**Originally known as the American Society for Testing and Materials, ASTM is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.
http://en.wikipedia.org/wiki/ASTM_International*



Dr. Ping Fu, Senior Scientist, and Dr. Steve Fabijanski, president and CEO, in the Agrisoma Biosciences lab located in the National Research Council facilities in Saskatoon, SK.

A paradigm shift in wastewater treatment

ECOLIBRA SYSTEMS

Dr. Lakshman



Dr. Gurunathan Lakshman believes we need to be innovative about environmentally-friendly wastewater treatment, recycling and consumption, or we will face dire straits “that will arrive sooner rather than later.” Lakshman, who co-founded the environmental technology company EcoLibra Systems Inc. four years ago with CEO Jason Tratch, says we have to be cognizant of the environmental crises we are facing; one of which is a shortage of water. “I’m not talking about the distant future; it’s the very immediate future in terms of reducing the amount of ammonia and other pollutants in waterways.”

The status-quo in wastewater treatment in Canada for the last hundred years has been open lagoons, where large pools of livestock manure are treated with bacterial processes that clean the water. But lagoons also produce large amounts of greenhouse gas, don’t work during colder months and have the potential to leak contaminants into the surrounding soil.

Dr. Lakshman, who has a doctorate in science and environmental technology, created System Ecotechnologies, an independent research laboratory, in 1986. About 10 years ago he was approached to develop a treatment for hog manure, which he later patented. The treatment produced contaminant-free water and nutrient-rich bio-solids – without the greenhouse gases. After the collapse of the hog industry, Lakshman adapted the technology to treat municipal

sewage and began searching for a business partner.

When Jason Tratch was first introduced to Lakshman’s low-cost, high-quality chemical-based treatment system, he immediately saw the potential for a paradigm shift in wastewater treatment technologies. The two men formed a business plan and a model, focusing on rural and municipal waste treatment.

EcoLibra’s system is mechanical, doesn’t emit greenhouse gases, is 10 times smaller than a typical lagoon-style treatment site and works in wintry weather. Plants are housed in buildings of various sizes, depending on the volume of sewage treated in one day (For example, a plant that treats 300 m³ of sewage per day is housed in a 2600 square foot building, while plants that treat 50 m³ of sewage are housed in shipping containers). The contaminant-free water can be used for irrigation, car washes or fire protection. The system also removes nutrients such as nitrogen, phosphorus and potassium, condensing them into bio-solids that can be used as fertilizer.

In order to better understand the intricate relationships that develop with stakeholders and partners, Tratch has enhanced his science background (he has a degree in biology and agriculture) with certifications in many business-related areas. He applies that knowledge to increasing sales of the new technology. “The beauty of science is that you can see a process; how treating wastewater can kill E. coli through a bacterial or chemical reaction,” he says. On the flip side, he notes, it’s really people that make the solution. “You can have the best technology in the world and it might never be sold – but if you have a good team

EcoLibra’s
system
**DOESN’T
EMIT
GREENHOUSE
GASES**

around it and a good business concept you can commercialize it.”

According to Tratch, the biggest sales hurdle the new company had to address was simple: people didn’t believe it worked. To dispel this perception, EcoLibra spent over half a year and a hundred thousand dollars on an Environmental Technology Verification (ETV) Canada process. “At the end we got a 700-page report saying that our system will work and it was wonderful.”

Armed with ETV Canada approval, EcoLibra was able to build and sell plants to several clients in Saskatchewan, one at Chitek Lake north of Spiritwood and two on opposite sides of Wakaw Lake in the RM of Hoodoo. EcoLibra has set up offices outside of Canada, including Poland and Alaska, USA, and is currently in negotiations with interested Middle Eastern countries to set up plants there.

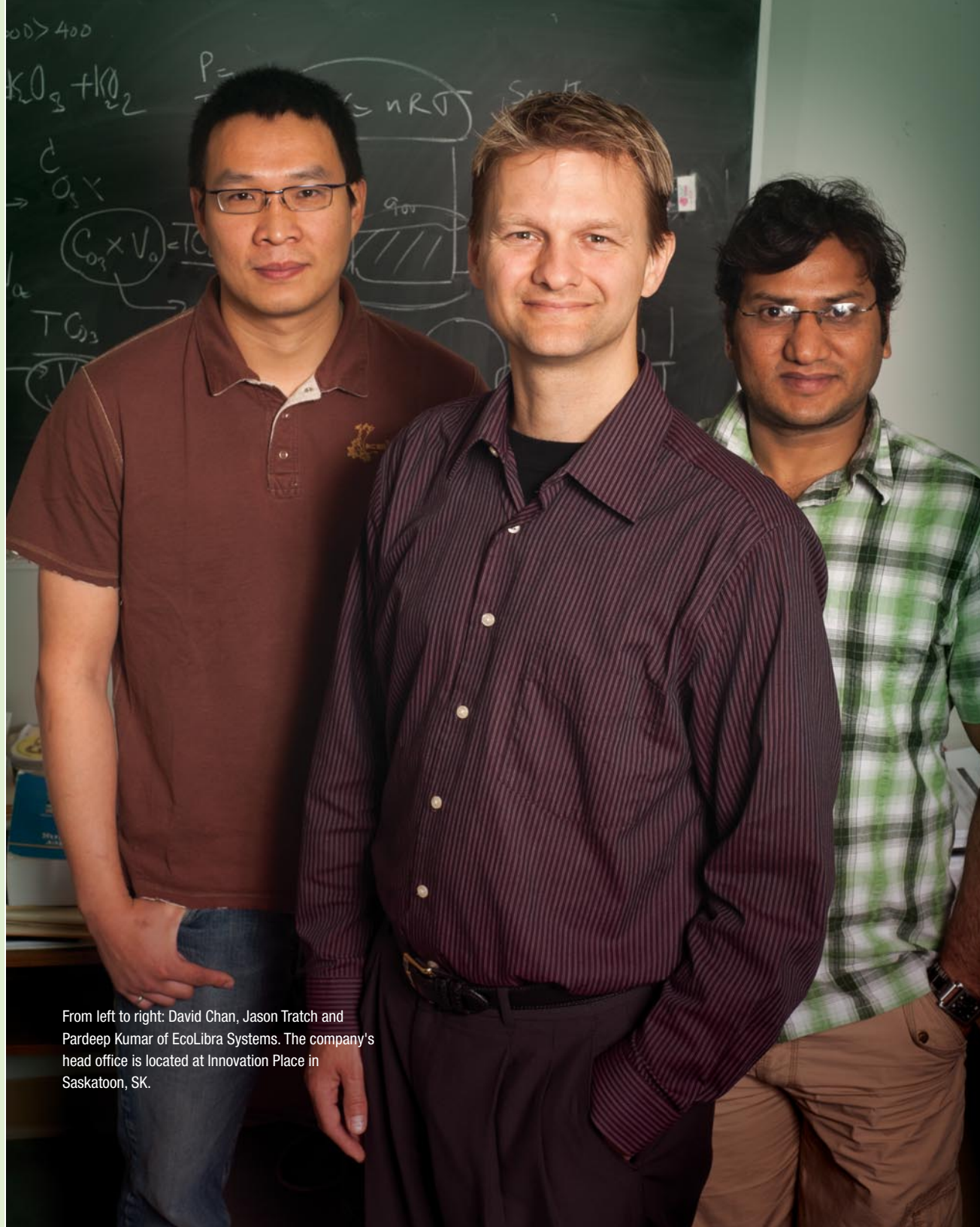
Lakshman says EcoLibra’s philosophy is not just to develop a treatment system. “Our goal is to develop the knowledge base for the client... to see how they can gainfully use the treated water because now it’s available where it wasn’t before.”

Tratch adds, “We’re trying to network and educate people on wastewater and start to move away from legacy-based, bacterial-based systems. Ag-West Bio is helping us spread this education, along with the Schools of Engineering, Environment and Public Health at the University of Saskatchewan.”

Brad Bly, Ag-West Bio’s Director of Commercialization, has been working with EcoLibra over the past year. He says the company’s technology is addressing a gap in the industry and providing a solution. “There is a real potential for the communities in rural and northern Saskatchewan.”

Bly is enthusiastic about the future of the young company. “EcoLibra merges Jason’s entrepreneurial ability with Dr. Lakshman’s technology creation and invention ability. They’re a real tour de force.”

For more information visit www.ecolibrasystems.com ■



From left to right: David Chan, Jason Tratch and Pardeep Kumar of EcoLibra Systems. The company’s head office is located at Innovation Place in Saskatoon, SK.

Communications and Events

GETTING THE WORD OUT



Sharing information and ideas is important for sector growth. Communication activities at Ag-West Bio focus on bringing the bioscience community together and showcasing our strengths to the world.

The Ag-West Bio website is our information exchange hub, housing news, event information and the Bio Bulletin, our newsletter. The web-based Bio Bulletin was re-launched in a new format in December, 2011. Google Analytics show it is being read in more than 40 countries.

Ag-West also manages www.saskatchewanbiosciences.ca, a website that hosts information about the capabilities of many Saskatchewan-based companies.

To complement the Saskatchewan Biosciences website, we published the first edition of our 'little green' book: Saskatchewan's 2012 BioScience Resource Guide. The book showcases a good selection of Saskatchewan's bio-based companies and service providers and has proven to be a valuable tool to illustrate the wide scope of activities in our province. A second edition is planned for winter 2013. Our goal with this publication is to capture every bio-based company in Saskatchewan.

Social media has been the buzzword for the past few years. To determine how our community currently uses social media, we conducted a survey. Some findings: Of the group surveyed, 52 percent are online between 15 and 40 hours per week; there is interest in Twitter and Blogs, with LinkedIn being the most-used social media platform. Forty-six percent felt social media was important or very important. The survey was followed by a

well-attended workshop facilitated by Mike Klein entitled Developing a Winning Social Media Strategy. The social media tools we have chosen to start with are Twitter (@agwestbio), a blog and YouTube.

An exciting project spearheaded by AWB is a series of videos featuring students who participated in the 2012 Sanofi-Aventis BioGenius Challenge (SBCC) along with their mentors, produced by Evan Hardy Collegiate Media School. The videos will be posted to YouTube and distributed with the goal of enticing more high school students to get involved in biosciences.

The saying goes, "When you want something to get done, ask a busy person." This seems to be the case for the Ag-West Bio Blog, which features editorials by some very busy people in our community – scientists, academics and business experts. We are grateful to them for taking the time to contribute.

Right: Grade 7&8 students take part in a Biotech Blast workshop at the Sask Food Centre during National Biotech Week.

Below: Mayor of Mississauga, ON, Hazel McCallion, and Wilf Keller try out a Saskatoon Berry treat served at the Saskatchewan Biosciences booth in the Canadian Café during BIOTECANADA's Gold Leaf Awards at BIO 2012 in Boston, MA.







(Find out who the bloggers are at www.agwest.sk.ca/blog). The wide-ranging topics have generated comments from around the globe with a positive effect on our website stats.

Getting together

Events kept Ag-West Bio staff very busy this year. We were pleased to have Dr. Roger Beachy (Donald Danforth Plant Science Center), Randy Hoback (MP for Prince Albert), and Alanna Koch (Deputy Minister for Saskatchewan Ministry of Agriculture), speak at our 2011 Annual Meeting; commercialization seminars featured Hergott Duval, Corey Keith & Associates and Banda Marketing Group; and luncheons included talks by Syngenta and Cargill representatives, exploring the potential for public-private research partnerships. Research commissioned by Ag-West Bio was presented at two events: John Clarke's Trends in Western Canadian Plant Breeding; and Mary Ellen Hodgin's study to identify the needs of the bioscience cluster in Saskatoon.

We collaborated with other organizations on a number of events. A few examples are CLS and the U of S Saskatchewan Structural Science Centre (SSSC) presentations; a lecture by Dr. Hans Joachim Braun, CIMMYT Director, Global Wheat Program during the Wheat Summit in February; and *Connecting*, an NSERC event that brought researchers together from many local institutions to explore potential partnerships. We also assisted AdeTherapeutics with a press conference to announce Health Canada approval to begin clinical trials for its promising technology for reducing post-surgical scarring.

A major conference, the 4th International Biofumigation & Biopesticides Symposium, was held in October. Speakers and delegates from 13 countries attended this important conference to discuss novel ideas and new products for controlling agricultural pests and pathogens.

With support from Enterprise Saskatchewan and Western Economic



Ag-West Bio's events are a great way to build your professional network.

Diversification (WD), Ag-West Bio led delegations to the World Congress on Industrial Biotechnology and Bioprocessing in Orlando, FL and to the BIO International Conference in Boston, MA this year. World Congress has been recognized within our community as a key event for getting Saskatchewan companies onto the world stage. AWB hosted a booth and led the Saskatchewan Biosciences team, which included Agrisoma Biosciences, Canadian Light Source (CLS), POS Bio-Sciences and Enterprise Saskatchewan. Steven Fabijanski, president & CEO of Agrisoma, had an opportunity to present information about his company's work commercializing biojet fuel made from *Brassica carinata*.

At BIO 2012 in Boston, the Saskatchewan team included Enterprise Saskatchewan, Innovation Saskatchewan, Prairie Plant Systems, AdeTherapeutics, Okanagan Specialty Fruits, VIDO-InterVac, CLS, Saskatchewan Research Council, the U of S Industry Liaison Office and

SIASST. We were pleased to be joined by Rui Song, a Walter Murray Collegiate student and regional winner of SBCC, who also took second place in the national competition and third in the international competition held at BIO. During BIO, we co-hosted a breakfast with Missouri Biotechnology Association (MOBIO) in an effort to reach out to this region that has similar interests to Saskatchewan. Media pickup for news releases we issued during BIO was excellent, and we received rave reviews for our Saskatoon berry daiquiris, served during BIOTECCanada's Gold Leaf awards in the Canadian Café.

Ag-West Bio continues to coordinate National Biotechnology Week activities in Saskatchewan, working with a committee drawn from the bioscience community to organize outreach events, like Biotech Blast for grades 7-8 students and The Amazing Biotech Race for post-secondary students. Other events include luncheons, a public lecture, a commercialization seminar, and Biotech & Beer, a networking event held at Boffins Club, Innovation Place.

Together we really are stronger

Saskatchewan strives to be competitive in the bioeconomy on a global scale. At Ag-West Bio, we believe this starts with growing a community here at home and showcasing our capabilities to the world. ■

Ag-West Bio members

AdeTherapeutics Inc.
 Advance-Tek Consulting Inc.
 Ag in the Classroom
 Agriculture and Agri-Food Canada (AAFC)
 AAFC-Saskatoon Research Centre
 Becker Underwood, Inc.
 Bill Brown
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 College of Agriculture & Bioresources - U of S
 Communities of Tomorrow
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 Saskatchewan Environmental Industry and Managers Association (SEIMA)
 Saskatchewan Flax Development Commission
 Saskatchewan Food Industry Development Centre Inc.
 Saskatchewan Food Processors Association
 Saskatchewan Fruit Growers Association
 Saskatchewan Herb & Spice Association
 Saskatchewan Ministry of Agriculture
 Saskatchewan Ministry of the Economy
 Saskatchewan Pulse Growers
 Saskatchewan Research Council
 Saskatchewan Trade & Export Partnership (STEP)
 Saskatoon Regional Economic Development Authority (SREDA)
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 Western Canadian Functional Food & Natural Health Product Network (WCFN)

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Agriculture et Agroalimentaire Canada

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Saskatchewan Ministry of Agriculture

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