#CREATEDATGUELPH

UNIVERSITY of GUELPH

CATALYST CENTRE

# ANNUAL REPORT 2015-2016

The Catalyst Centre at the University of Guelph helps translate research into applications that make an impact on society. **Our inventions help create jobs, protect the environment, and improve quality of life.**

Looking back, the University of Guelph has a long-standing tradition as being one of the most inventive universities in Canada. Guelph research has led to new vaccines to improve human and animal health, new crop varieties to improve farm yields and new biodegradable plastics to reduce pressure on landfills, among many other solutions to many challenging and complex matters across many disciplines. The Catalyst Centre has had an outstanding year in 2015-2016 with an increase from the previous year of active agreements and an increase in royalty revenue. Our emphasis on strengthening relationships with industry has yielded a significant number of collaborations between industry and researchers.

Looking ahead, we will continue to be adaptive and draw on the strengths of our researchers who seek answers that will prove effective in catalyzing discovery and change. We will help find innovative solutions to society's problems, and move inventions and ideas to market. We look forward to building on this momentum to enhance our research innovation and knowledge mobilization agenda at the University of Guelph and to further broaden our positive societal impact.

Sherri Cox
*Executive Director*

# 2015 - 2016

**29** reports of invention

**27** licenses/options

**8** patents issued

**$134 MILLION** total sponsored research

**259** active agreements

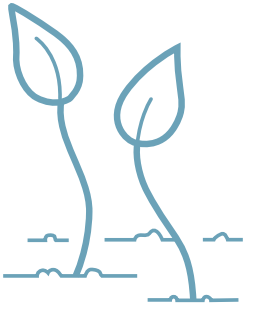
**$2.64 MILLION** royalty revenue

# STARTUPS

**$21.3 MILLION** equity raised*

**17** active companies

**115** jobs



**2** new startup companies in 2016

*amount raised by our active companies since their inception

# FROM RESEARCH IDEA TO STARTUP

**The Catalyst Centre** is proud to help form companies that create products and services using the innovative research at Guelph, contribute to the local and national economy, and improve outcomes for their customers.

By the end of 2015, these companies were employing **115 people** and developing or selling products in a wide variety of fields, including pharmaceuticals, food ingredients, roofing systems and bio-based plastics.

# NEW STARTUPS

## SMART GREEN TECHNOLOGIES

**Dr. Youbin Zheng** and **Greg Yuristy** spent years developing new technology to make installing green roofs faster and easier. With the **Substrate Block System**, **Pre-Vegetated Mats** and unique growing substrates, they are ready to make inroads into a growing industry. Their Ontario startup company, **Smart Green Technologies**, began commercially employing these innovations in 2015.

## HARVEST ONE AGRITECH

Food waste claims nearly 50% of all food produced. **Dr. Gopi Paliyath** and his collaborators have been working with a natural compound called hexanal for nearly twenty years with the goal of reducing that statistic. Hexanal helps plants to preserve their cell membranes, resulting in slower ripening and improved shelf life. British Columbia-based startup company **Harvest One Agritech** was formed in 2015 to develop hexanal-based products for farmers and distributors that will reduce food waste globally.

# EXISTING STARTUPS

## CGTech

**Drs. Amar Mohanty** and **Manju Misra**, with their team at the University's Bioproducts Discovery and Development Centre (BDDC), are creating novel bioproducts for use in many applications, from consumer products to car parts. Leamington, Ontario company **Competitive Green Technologies** has collaborated closely with the BDDC to produce biobased resins to meet customer needs, introducing four products to the market to date. This includes Club Coffee's *PurPod100™*, the world's first certified 100% compostable single serve coffee pod.

## MIREXUS

**Dr. John Dutcher**'s lab in the Physics Department discovered that sweet corn contains large amounts of nano-sized structures with a range of applications in cosmetics, drug-delivery and nutrition. Guelph startup company **Mirexus** has developed this botanical extract as *PhytoSpherix™*, which reached the market in 2015.

# INNOVATION HIGHLIGHTS

*The University of Guelph produces innovative research, and the Catalyst Centre works with our innovators to help find commercial partners and turn their ideas into commercial products.* ***A few notable highlights:***

**Dr. Bonnie Mallard**'s lab in the Department of Pathobiology created a method of selecting cows and bulls based on their immunity to disease. Canadian genetics company **Semex** has adopted the test to produce *Immunity+*™ genetics, enabling farmers around the world to improve the health of their herds.

The Biodiversity Institute of Ontario was created at Guelph to study biodiversity and to develop DNA-based barcodes for millions of species. The creation of that knowledge and data enabled **Drs. Bob Hanner** and **Amanda Naaum** to develop a series of DNA probes to easily identify species from a piece of meat or fish. The probes have been adopted by the company InstantLabs for use in reducing food fraud.

**Dr. John Prescott** in the Department of Pathobiology has long been interested in the role of the bacteria *Clostridium perfringens* in animal disease, including both food animals such as chicken and pigs and companion animals such as horses and dogs. Dr. Prescott's work has led to both a vaccine and a diagnostics program, with the company Idexx Laboratories releasing a series of diagnostic tests in 2015.

# GERMPLASM

There are nearly **200 active license agreements** associated with crop varieties that have emerged from the University's breeding programs. Our licensee partners, such as *SeCan Association* and *Fox Seeds*, help to ensure that these varieties reach the farmers that need them.

**199**
active license agreements

**24**
species

**1,884**
varieties

## 120 YEARS

The University of Guelph has a long history of developing new plant varieties that goes back 120 years. In that time, nearly 2,000 new plant varieties have been developed, spanning **24 crop species:**

*alfalfa, apple, apricot, asparagus, barley, beans, bluegrass, canola, cherry, clover, corn, hemp, nectarine, oat, orchard grass, peach, plum, Japanese plum, strawberry, soybean, tomato, trefoil, rutabaga and wheat*

## SOYBEAN

**OAC Bayfield** is a soybean variety grown in Ontario for more than 20 years and named Seed of the Year in 2013. It has sold more than 46,000 tonnes of seed over its lifespan. The same program has produced additional popular varieties such as fellow Seed of the Year winner OAC Kent.

## ASPARAGUS

**Guelph Millennium** is an asparagus variety that enjoys a dominant market share in Ontario with increasing opportunities in the US and Europe. The next generation variety, called Eclipse, is expected to arrive on the market next year.

## ORCHARD GRASS

**Dividend VL** is a late maturing orchard grass that was introduced to the market in 2008 and won Seed of the Year in 2014. Dividend matures at the same time as alfalfa, making it a great option for producing high quality hay crops.

## BEANS

**The pulse bean breeding program** produces beans that combine disease resistance, outstanding yields, and great cooking quality. Examples include the Navy bean Rexeter, the light red kidney bean Inferno, and the white kidney bean Yeti.  2016 has been declared by the UN as the International Year of Pulses - even more reason to enjoy these and other varieties.

# INNOVATION OF THE YEAR AWARD

The University of Guelph presented its inaugural **Innovation of the Year** award this year on June 10. The award recognizes innovations arising from the University's research on their inventiveness, their progress toward achieving commercialization, and potential or demonstrated positive impacts on society.

The innovations selected this year were a carbohydrate vaccine for *Clostridium difficile (C. difficile)* created by a team led by Dr. Mario Monteiro, Department of Chemistry; and a fully compostable resin used for single-serve coffee pods, by a team led by Engineering and Plant Agriculture Dr. Amar Mohanty.



Left to right: Tao Wang, Amar Mohanty, Nima Zarrinbakhsh, Manjusri Misra, Arturo Rodriguez (with Malcolm Campbell).

The award was presented by Vice President of Research, Dr. Malcolm Campbell. "Each of these research teams are making a transformative difference to the lives of people," said Campbell.

*C. difficile* infections cause severe diarrhea that can lead to life-threatening inflammations of the colon. Dr. Monteiro and his team created a carbohydrate-based vaccine that targets the surface polysaccharides exposed by C. difficile.

**"It's very satisfying that what you do with your hands, and with chemistry, can have a positive impact for global health"**

**- Dr. Mario Monteiro**

The second award was for an innovation focused on single-serve coffee pods and the challenge this creates for cities and landfills, since these pods typically cannot be composted.

Dr. Mohanty and his team at the Bioproducts Discovery and Development Centre (BDDC) worked to create a 100 per cent-compostable resin used to make the component that holds together single-serve soft pods for coffee and other hot beverages. The product is already in stores in both Canada and the United States.

"We're focused on supporting the development and growth of the bio-based economy, and it's gratifying when an innovation is able to go to market so quickly," said Dr. Mohanty, director of the BDDC.

# INDUSTRY LIAISON

The Catalyst Centre's Industry Liaison Program (ILP) is designed to help companies access the University's research capacity and facilitate the development of collaborative projects with its faculty. Industry Liaison Officers help make connections and provide strategic advice with regard to federal and provincial funding programs that can increase the impact of collaborative projects. By doing this, the ILP contributes to stronger relationships and research plans to achieve the goals of both the company and the research team.

## GREGOY BEDECARRATS

When Dr. **Gregoy Bédécarrats** studied how  specfic light spectra could impact the behaviour and production of laying hens, it was a great insight to understand how a chicken's light receptors work. When he was introduced to local company **Thies Electrical Consulting**, the work evolved into a collaboration that resulted in the commercial production of the **AgriLux™** LED bulb. What started as basic research is being used to enable healthier, more productive hens.

## BRENDA COOMBER

**Dr. Brenda Coomber** is working with Ontario company Rna Diagnostics to study how biomarkers can be better used to help dogs suffering from lymphoma. The project, with help from the Industry Liaison Program, received funding from Ontario Centres of Excellence, and will be used to refine ways of determining which patients are likely to respond to treatment.

# GRYPHON'S LAAIR

Gryphon's LAAIR (Leading to Accelerated Adoption of Innovative Research) is a program that received $2 million over a three-year period to promote the commercialization of agricultural innovations developed by the University of Guelph. The program was designed to fill the funding gap that exists between the creation of new technologies and their eventual adoption by the agricultural industry. Over three years, 20 product development grants ($25,000 each) were awarded to enable researchers to explore the application and value proposition of early stage but high potential agricultural technologies. As well, 13 commercialization grants ($125,000 each) were funded to support collaborative business-focused projects directly involving targeted industry partners interested in launching technologies as products or services in Ontario that are very close to market-ready.

Early examples of success include startup Mirexus, which was able to leverage their 2014 award with Physics professor Dr. John Dutcher into a $5 million Series A investment; and Molecular and Cellular Biology professor Dr. George van der Merwe, who was able to develop his work on wild Ontario yeasts and help his graduate students Richard Preiss and Angus Ross launch their company Escarpment Laboratories, a provider of unique brewing yeasts.

# PROJECTS AWARDED IN 2016

| | | |
|---|---|---|
| **HELEN FISHER** | **$25,000** | Evaluation of advanced winegrape selections for cool/cold climate wine growing regions |
| **SURESH NEETHIRAJAN** | **$25,000** | Evaluation of avian flu multiplex biosensor platform to the point of care setting |
| **GRAHAM TAYLOR** | **$25,000** | Automated plot extraction and image analysis software-as-a-service for agricultural fields |
| **JOHN CRANFIELD** | **$25,000** | Unlocking new value for an old crop: measuring and identifying channel specific strategies to commercialize a differentiated Ontario quinoa based food product |
| **LUCY MUTHARIA** | **$25,000** | Developing a reagent to detect fecal antibodies against mycobacterium avium subsp. paratuberculosis |
| **ALLAN KING** | **$25,000** | Market assessment of a chromosome screening and diagnostic service for the swine industry |
| **PRAVEEN SAXENA** | **$25,000** | Integrated plant production system for Hop *(Humulus lupulus L.)* |
| **BRANDON GILROYED** | **$25,000** | A new biopesticide for greenhouse crops: mode of action, regulatory requirements and patent protection |
| **ANDREAS HEYLAND** | **$25,000** | Testing of novel micro-algal strains for the reduction of carbon dioxide, nitrates, and phosphates in recirculating shrimp aquaculture systems |
| **JOHN DUTCHER** | **$125,000** | Advanced nutraceuticals from Ontario sweet corn |
| **WAEL AHMED** | **$125,000** | Field tests of novel airlift pump technology for sustainable aquaculture production |
| **SURESH NEETHIRAJAN** | **$125,000** | On-farm field trial for validating point of care device for detecting metabolic diseases in dairy cattle |

# TEAM

**SHERRI COX** DVM, MBA
**EXECUTIVE DIRECTOR**
coxs@uoguelph.ca

## TECHNOLOGY TRANSFER

**STEVE DE BRABANDERE** MBiotech, MBA
ASSOCIATE DIRECTOR
*Food, Agriculture, Bioproducts*
sdebrab@uoguelph.ca

**STEPHEN BOWLEY** PhD
ASSISTANT DIRECTOR
*Plant Germplasm*
sbowley@uoguelph.ca

**DAVID HOBSON** DVM, DVSc, PEng
TECH TRANSFER MANAGER
*Human and Animal Health, Engineering*
dhobson@uoguelph.ca

**TYLER ZEMLAK** PhD
TECH TRANSFER OFFICER
*Life Sciences*
tzemlak@uoguelph.ca

## INDUSTRY LIASON

**GREGOR LAWSON** PhD
INDUSTRY LIAISON OFFICER
lawsong@uoguelph.ca

## SUPPORT

**LAURIE GALLINGER**
TECH TRANSFER AND
AGREEMENTS ASSISTANT
ipadmin@uoguelph.ca

**MELISSA WILLIAMS**
OFFICE COORDINATOR
melissaw@uoguelph.ca

**HOSNI TAKY-ELDEN**
ACCOUNT ADMINISTRATOR
htakyel@uoguelph.ca

Axelrod Institute of Ichthyology (bldg 92)
50 Stone Rd E, Guelph, ON, N1G 2W1

(519) 824-4120, Ext. 58878
catalystcentre@uoguelph.ca
@catalystcentre

**CATALYSTCENTRE.UOGUELPH.CA**

UNIVERSITY of GUELPH