Discover

WESTERN RESEARCH PARKS
2015 - 2016 ANNUAL REPORT

Western
Research Parks

WESTERNRESEARCHPARKS.CA

OURS IS AN AMBITIOUS GOAL...

...one that may never be completely attained, but one that must be sought nonetheless and one that serves as our core purpose. Namely to be:

> a place, a destination, a home where talent and technology, industry and invention, dreams and discoveries converge to contribute extraordinary creations to our world and our future

> an enabler, principled in all dealings, positive in approach, and uncompromising in values

> a catalyst that anticipates needs, responds to requests, and continually seeks the means and methods that can help all those that share in the quest, reach their own goals

> relentless in the pursuit of forms and formulas that can help create economic and social good today and tomorrow

To Our Park Clients, Partners and Stakeholders

It is our distinct pleasure to share with you the 4th Edition of the Western Research Parks Annual Report. As one of Canada's oldest and largest innovation clusters, Western Research Parks is very proud of its contribution to the advancement of the nation's knowledge economy and a generation of new talent and technologies that is now serving the world.

In fact, since the inception of Western's first Park in 1989, over 35 companies have effectively "graduated" from the three Park incubators in London and Sarnia; and the Parks' current roster of companies collectively employ nearly 1,800 highly-skilled knowledge-based workers and contribute an impressive $125 million to the Canadian economy annually.

Western Research Parks is equally proud of its growing list of partners; the organizations, institutions, funders and government agencies that are all contributing their time, energy and resources to this thriving ecosystem. Just this past year, our Parks have borne witness to new investments and expanded operations by Fanshawe College and Lambton College, the National Research Council, Renishaw PLC and the Fraunhofer Project Centre. The Parks have also welcomed 10 new startups and over 185 new employees to the program. Finally, Western Research Parks is collectively maintaining a 98 percent occupancy rate, a track record that has allowed the program to remain ranked among the top 10 University-based incubators in North America. We could not be more proud of our tenants, their teams and their track records. They ensure the region's high-tech legacy, and position Southwestern Ontario for continued success in the knowledge economy.

Therefore, Western Research Parks is once again very pleased to highlight a few of the Parks' many tenant and partner success stories from the past year. However, in a slight twist from previous reports, we have elected to feature our most promising clients by sector to reflect the region's growing emphasis on three key research, development and commercialization streams, namely: Medical, Bio-Industrial and Advanced Manufacturing. While our Parks are not exclusively focused on these sectors, they do fit well with our region's competitive strengths and strategic interests.

Western Research Parks will continue to act as an enabler of economic and social good in Southwestern Ontario. We are very proud of our achievements to date and look forward to even greater success in the years to come.

WESTERN DISCOVERY PARK
WESTERN ADVANCED MANUFACTURING PARK
(L-R): Paul Paolatto, Terry King, Jennifer Dawe, Julia Hoare

WESTERN SARNIA-LAMBTON RESEARCH PARK
(L-R): Back: Aung Oo, Tom White (former employee), Doug Rose, Katherine Albion, Tom Strifler. Seated: Caroline Craig, Missing: Ron Listhaeghe

Paul Paolatto
Executive Director
Western Discovery Park
Western Advanced Manufacturing Park

Tom Strifler
Executive Director
Western Sarnia-Lambton Research Park

> LONDON MEDICAL NETWORK

Over the past year, the London Medical Network has made considerable progress on several fronts. For one, the new entity is now formally organized and operational, complete with a governance structure, business and scientific advisory teams, and a multi-discipline operating capability.

The Network has also begun to identify, select and invest in a number of key initiatives; including, and most notably, the attraction of new private sector partners such as U.K.-based Renishaw PLC, the coupling of the Network's new business interests with proven regional business development partners such as the National Research Council and TechAlliance, and the continued pursuit of matching public sector investments in infrastructure required to accommodate and support all of these promising research, development & commercialization (RD&C) interests.

One of the more impressive developments this year has been the Network's investment in ADEISS, Western University's new Additive Design in Surgical Solutions Centre that is scheduled to open this fall. ADEISS will be Canada's first medical and dental device RD&C centre using additive manufacturing technology developed by global leader, Renishaw. The newly-incorporated company will serve as the global design and commercialization hub for a new product development partnership between Renishaw and London's extensive research cluster in Musculoskeletal and Brain Health.

Another promising initiative that is just getting started is the Network's new partnership with TechAlliance and its new program called Burst. Burst is a high-intensity business development program that surrounds early stage medical companies with the training, mentoring, capital and ongoing support needed to grow a company. Specifically, the program blends Network investment with private and public sector seed capital to accelerate promising medical and health-related companies and move them along the growth continuum. It is hoped that such investments, when coupled with TechAlliance's expertise in early stage business development, will rapidly expand the roster of organically-grown medical companies operating in the region.

Finally, the Network continues to pursue new opportunities with prospective attraction candidates in the health care sector whether they are companies or research teams. Currently, the list includes high-growth, high-value targets in Europe, Asia and larger centres elsewhere in Canada. The Network continues to believe that the mix of organically-grown interests coupled with global leaders in the health care field will not only serve the region's economy well, it will also maintain London's legacy in medical innovation and allow it to become a recognized destination for world-class care.

LONDON MEDICAL NETWORK

> RENISHAW

Renishaw, a British engineering and scientific technology company, has partnered with the City of London, Western Research Parks, Lawson Health Research Institute and the Robarts Research Institute to open their new Park facility by September 2016. With almost $1 billion CAD in revenues, Renishaw brings global leadership to Canada's emerging additive manufacturing industry and metal 3D printing. "We've chosen London," says Dafydd Williams, Director and General Manager for Renishaw Canada. "This is Renishaw's first major investment in North America for medical additive manufacturing solutions."

In additive manufacturing, Renishaw is the only U.K.-based business that designs and manufactures industrial machines which 'print' parts from metal powder. Williams says London presented a unique environment for the development of innovative implantable devices using these technologies. "We can see setting up a manufacturing facility here," he says. "Our hope is that these new devices will quickly end up inside of people and impact their quality of life. We have to complete a vast amount of R&D and clinical research to ensure our products are safe and effective."

Williams says initially the group will employ five people but they plan to ramp-up as new products require manufacturing and scale. "We will start with the lowest regulatory burden in devices for orthopedics, then cardiovascular applications and then neurological applications," he says. "We already produce cranial plates and surgical cutting guides in Europe utilizing this technology for patients who have lost part of their skull to cancer or infection. Our vision is for many applications."

Dr. David Holdsworth is a scientist in Robarts' Imaging group and an expert in musculoskeletal disease, including the interface between bones and metal implants. Years ago, Holdsworth purchased a Renishaw system and attracted their attention as

MEDICAL

a productive end-user. "Western Research Parks is a unique environment for us with all of the skill sets in one location," he says. "We are attracted by Robarts' imaging and access to a teaching hospital with full preclinical and clinical research capabilities."

Williams credits Paul Paolatto and Dr. Holdsworth as instrumental to their plan to ship products globally from London, Ontario. "That is the intention and we are very excited about this and fully committed to the long term success of this breakout project," he says.

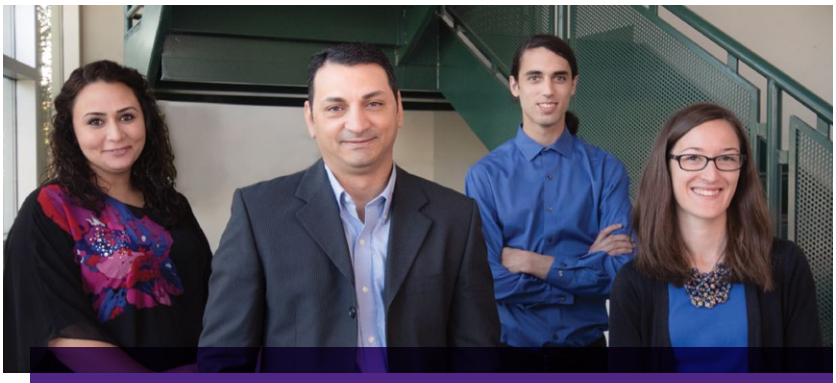
> CERESENSA

Medical imaging equipment contains multiple layers of radio frequency (RF) resonator/coil and advanced electronics. These coils are the gear that keeps the body part (like the head) perfectly still during scanning to obtain the image. However, to create resonators that are transparent to gamma rays (and kept literally out of the picture) has been an industry challenge.

This was particularly critical for a system that combines magnetic resonance imaging (MRI) with positron emission tomography (PET) scanning. Adam Farag, Co-Founder and Director of Research at Ceresensa, calls PET/MRI game-changing. "MRI delivers high-contrast and clear images of the anatomy," he says. "In a PET scan, scientists and radiologists can capture metabolic activity to better diagnose oncological, neurological, and cardiovascular diseases. When MRI images are fused with the PET you are able to see the regional distribution of the cancer and quantify how advanced it may be."

The first PET/MRI system in Canada was installed in London at the Lawson Health Research Institute in 2012. "Ceresensa put in a proposal to develop PET/MRI brain coils in this niche market," says Farag. "Then in collaboration with Lawson, we patented the first Transparent-PET/MRI, 32 Channels RF coil for Simultaneous Brain Imaging."

Farag says that Ceresensa benefits from collaborations that result from proximity and access to two world-renowned imaging centres at Robarts Research Institute and Lawson. He also says that Western Research Parks is a great incubator for start-up companies and that they leverage their resources to commercialize products globally. "Our first purchase order was cut for Siemens in Australia in October 2015," he says. "Now it's a product sought worldwide."



CERESENSA
(L-R): Sarah Haider, Adam Farag, Joseph Argany, Eliza Argall

CANADIAN CENTRE FOR PRODUCT VALIDATION (CCPV)
Ben Cecil, Chief Business Officer, CCPV

THE CANADIAN CENTRE FOR PRODUCT VALIDATION

We love electronic devices in our mobile world until a crossed-wire tunes you in to the wrong frequency. Who keeps these signals straight?

Fanshawe College's Canadian Centre for Product Validation (CCPV) is a one-stop, secure and technologically advanced facility for product validation and consumer safety at Western Advanced Manufacturing Park (AMP). The newly-opened CCPV offers proof of concept or proof of claim for industry. Ben Cecil is the Chief Business Officer of the CCPV. "We explain why a product did or did not work," he says.

Customers in multiple industry sectors, including automotive, aerospace, building materials, consumer electronics, medical, defense and renewable energy, have signed on. The 25,000-square-foot, high-security Centre is designed to allow multiple companies to conduct tests simultaneously, in complete secrecy.

Cecil says much of their equipment is state-of-the-art for Canada, if not North America. This includes one of the largest acoustic chambers in the province that tests for noise interference.

The CCPV is also now home to the only Atonometrics solar simulator in Canada that provides sunlight exposure for continuous testing of photovoltaic (PV) modules for both new and old solar panels; and an electromagnetic compatibility chamber (EMC) to test for electronic interference.

Cecil says their location at AMP with Fraunhofer, the Collider Centre and the WindEEE Dome is great for client development and credits Park management for their fast-tracked opening.

NATIONAL RESEARCH COUNCIL OF CANADA

The National Research Council of Canada (NRC), a billion dollar federal agency of measurement standards, innovation and discovery, turned 100 on June 8, 2016. From R&D that helped develop canola, the CANDU Reactor, the Canadarm and Nobel Laureates, the NRC has a remarkable legacy of scientific achievement.

Dr. David Muir, Director, Research & Development, comes to the NRC in London after a career at 3M. He says the NRC's labs are packed with smart people and sophisticated laser-based equipment, the engines of growth in additive manufacturing - the process of joining materials to make objects from 3D model data. "We practice laser-based manufacturing research – anything that can be cut, polished or machined with a laser," says Muir.

In 1997, the NRC was one of the first tenants at Western Research Parks, and Muir plans to expand. "The NRC is expecting growth at this facility. We have 50 people in the building now and plan to grow to 60 next year," he says. "We also employ co-op students and have worked with about 30 graduate students."

Muir says their client base in the auto sector benefits by their proximity to the Park. "We work with companies across the region in lightweighting and fuel efficiency," he says. "And we watch with great interest the development of the connected car and autonomous, self-driving vehicles. The NRC needs to integrate new technologies into a vehicle platform. That may or may not include lasers."

Muir says they have attracted companies from across Canada to help transfer technology nationally. "We like our location at Western Research Parks because industry looks at us and can see professional R&D close to, but separate, from the University," he says. "Metal additive manufacturing is still embryonic commercially, but it's a hot topic. Aerospace and medicine lead the pack in additive manufacturing deployment and these companies have found us and they come here."

NATIONAL RESEARCH COUNCIL OF CANADA (NRC)
Dr. David Muir, Director, Research & Development

ADVANCED MANUFACTURING

FRAUNHOFER PROJECT CENTRE (FPC) FOR COMPOSITES RESEARCH

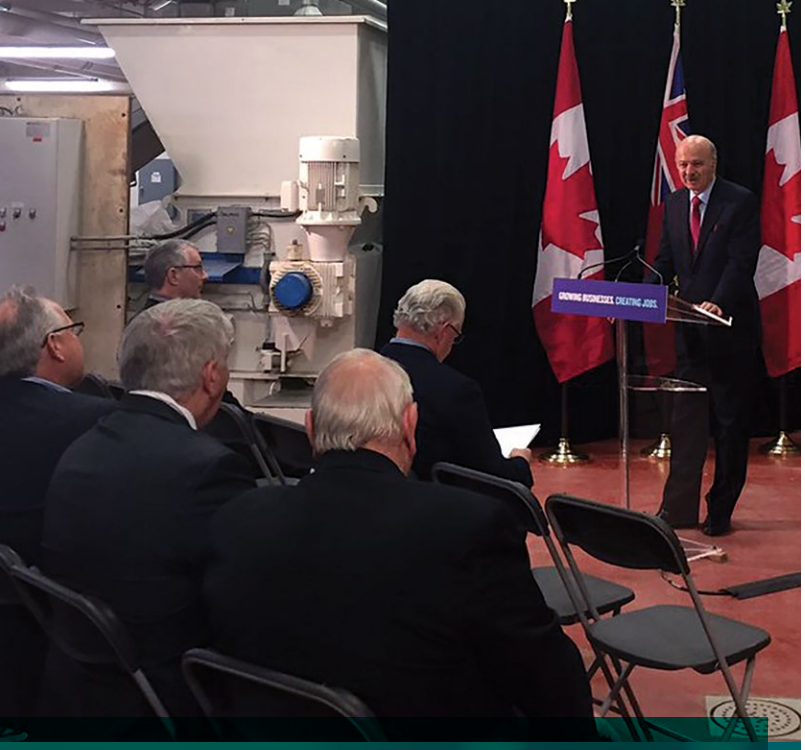
> FRAUNHOFER PROJECT CENTRE FOR COMPOSITES RESEARCH

After opening in 2011, the Fraunhofer Project Centre (FPC) for Composites Research, part of Germany's Fraunhofer Society for the Advancement of Applied Research, has just committed to another five years at Western Advanced Manufacturing Park. The FPC has contracts with over 50 companies including Original Equipment Manufacturers (OEMs) such as Ford and GM, as well as Tier 1 and 2 suppliers from across North America.

Peter White is the Executive Director, Government Relations & Strategic Partnerships for Western and a key architect of Fraunhofer's success here. "We have met the goals of our original vision and now generate significant revenue," he says. "The Fraunhofer and Western partnership has come up with unique client solutions. Each of us brings strong elements and we continue to expand new projects together in green energy, aerospace and building materials, in addition to the auto sector."

White says Fraunhofer helps companies exploit R&D to stay competitive in a tough economy. "Advanced manufacturing has been challenged in Ontario," he says. "If you are not providing high-value products, you'll feel pressured by the global marketplace. In auto, you have to have new products to be valuable suppliers to OEMs, but many companies cannot afford to invest in the equipment we have at Fraunhofer. It's not just R&D. We will work with Tier 1 and 2 companies through product validation and act as their initial production facility. We have one company back for their sixth project."

Clients in the auto sector use Fraunhofer's capabilities in lightweighting – the push to make cars more fuel efficient. "Companies come to us to make lightweight composite parts that are lighter and stronger than metal," says White. "The other challenge is the cost and the cycle time and we can prove that to support clients."



THE HONOURABLE REZA MORIDI,
Richmond Hill MPP, Minister of Research, Innovation and Science

CENTRE OF EXCELLENCE FOR THE COMMERCIALIZATION OF SUSTAINABLE CHEMISTRY INNOVATIONS

The petrochemical industry in Sarnia has a growing cluster of sustainable, innovative partners. Proponents of the bio-based or hybrid chemistry industry include Dr. Murray McLaughlin, the former Executive Director of Bioindustrial Innovation Canada (BIC), located at the Western Sarnia-Lambton Research Park. He says these two industries will grow together. "Our mission is to build a real bio-based industry in Sarnia focused on sustainable products," he says. "We do not want to replace petroleum but complement the industry with new hybrid products."

Ontario announced in June 2016 a $3 million investment to support a new hub in Sarnia-Lambton to commercialize plant-derived chemicals and bio-manufacturing. The Centre of Excellence for the Commercialization of Sustainable Chemistry Innovations is a partnership between BIC and the Western Sarnia-Lambton Research Park to help fast-track discoveries into the marketplace.

Dr. Katherine Albion, Director of the Park's Commercialization Centre, says their unique infrastructure helps this sector flourish. "We are the only research park in Canada with pilot plant space," she says. "This was DOW Chemical's commercial research facility. Clients are attracted to the region if they can scale-up at the Park and then build a commercial plant nearby."

A recent Park graduate, BioAmber, boosted the sustainable chemistry cluster when they opened their new commercial location in Sarnia. Comet Biorefining's feedstock operation will also create momentum. "We are happy to assist companies to help build the bio-based economy here," says Albion. "We have unique tools and networks not offered anywhere else."

LAMBTON COLLEGE AND WESTERN SARNIA-LAMBTON RESEARCH PARK

The growth of the bio-based industrial cluster in Sarnia-Lambton creates a host of new opportunities for youth. Dr. Mehdi Sheikhzadeh is the Dean of Applied Research & Innovation at Lambton College. With a career of research excellence, Sheikhzadeh and his team are well-positioned to develop applied research projects which provide jobs for students and graduates.

Sheikhzadeh says the Western Sarnia-Lambton Research Park attracts many companies – essential for industry-driven research opportunities. "The collaboration between the Park and the College's Applied Research Department creates an innovation hub," he says. "We complete each other's capacities. In Sarnia-Lambton you don't compete with each other – you work together to attract high quality people and start-ups, execute projects and commercialize technologies."

The proof is in the numbers. Lambton College executed 87 collaborative research projects last year in their five technology research centres: bio-products and processes, industrial materials, renewable energy, advanced manufacturing, water and wastewater and IT for process industries. "We hired 115 students to work as research assistants at the College - all for collaborative projects with industry," he says. "We have another 15 co-op students and also hired 20 graduates as research assistants. And we attract post-doctorate candidates – not just from Western but from Waterloo and beyond. Our goal is to help companies commercialize research and a big benefit for working with the College is that companies own the developed intellectual property."

He says their alliance with the Park, just across Highway 40 from Lambton College, is a bridge for innovation. "They have assets like lab and pilot plant space and they share their resources," says Sheikhzadeh. "The Park is a very good partner for us and the relationship has grown a lot. Both of us want innovative companies to grow here in our community."

Lambton College

Western
Sarnia-Lambton
Research Park

BIO-INDUSTRIAL

> COMET BIOREFINING

A modern sugar mill will sweeten the prospects of the green bio-industrial cluster in Sarnia. Comet Biorefining is designing a production facility for cellulosic dextrose, an important feedstock for companies like BioAmber, their Sarnia-based offtake partner. BioAmber will transform these sugars, which are similar to high-quality corn dextrose, into sustainable biochemicals.

Dr. Andrew Richard, Comet Biorefining's Chairman and Chief Technology Officer, says the region can be a global leader in bio-products. "Advantages here include infrastructure, nearby sources of feedstock, a progressive workforce and access to export markets," he says.

Richard says the biggest cost to produce these sugars is the raw material. Light and bulky feedstock, like corn stover and wheat straw, is expensive to transport. That is a sweet-spot for regional farmers who produce tons of excess residue from cash crop operations.

COMET BIOREFINING
(L-R): Dennis D'Agostino, Andrew Richard

Comet has signed a memorandum of understanding with the Cellulosic Sugar Producers Cooperative, an Ontario-based, farmer-owned sustainable supply chain that plans to aggregate, transport and store agricultural biomass. "Aggregation lowers the material cost and we benefit from working together as true partners," he says.

Richard says bio-products must be competitive all along the value chain. "The goal is to meet the cost and quality to replace or reduce chemicals in everyday products such as polyurethane, paints and coatings, and nylon," he says.

"Consumers are telling brands like Coke they want sustainable products. No one wants a bottle made from oil or food." Comet is locating at the TransAlta Bluewater Energy Park, the former DOW Chemical plant site, in Sarnia and will be operational in 2018. Richard says support from Western Research Parks has been critical to help them access a green chemical venture fund, set up a pilot plant in Italy and explore contracts. "We will eventually graduate to the Sarnia plant," he says. "But the Stiller Centre is a great facility and gives a lot to growth stage companies."

BIO-INDUSTRIAL

CAPSTONE ENGINEERING DESIGN COMPETITION
(L-R), Julianne Pohlner of WorleyParsons, and members of the winning team, Mark Pipher, Erica Glatt, and Clifford Palmer, with Janice McMichael-Dennis of Bluewater Power

> CAPSTONE ENGINEERING DESIGN COMPETITION

The Capstone Engineering Design Competition helps launch successful careers for fourth-year students at Western University's Department of Chemical and Biochemical Engineering.

Professor Shahzad Barghi says the Capstone program provides an active learning opportunity for his students. "They get a lot of constructive criticism and valuable exposure to industry," he says. "It is sort of like Dragon's Den. Students have never faced experienced engineer judges and they get to answer real, live questions."

Capstone, held each spring since 2005 at the Western Sarnia-Lambton Research Park, presents design projects to panels of volunteer judges made up of industry leaders in renewable fuels and energy, oil and gas processes, specialty chemical production and waste treatment.

Dr. Katherine Albion, Director of the Park's Commercialization Centre, says Sarnia-Lambton's industry sponsors view the students as potential employees and are excited to nurture their development. "They see it as the future," says Albion. "The next generation needs to be innovative to make advancements in the industries."

Capstone projects are complex. Students have to factor in geography, sustainability issues, safety, capital costs, payback, and of course, the critical engineering design elements.

Team members of one of this year's winning projects, Butanol Production from Sugar Beet Pulp, had some surprises. "It's one thing to study green technology," says Erica Glatt. "It's another to make it economically feasible." In fact, Clifford Palmer said their project did not work at an industrial scale. Mark Pipher appreciated expert advice about green processing. "We got to interact with industry in the classroom which grounded this project in reality," he says.

WESTERN RESEARCH PARKS

PERFORMANCE

1,766 NUMBER OF KNOWLEDGE-BASED EMPLOYEES

ESTIMATED ANNUAL CONTRIBUTION TO THE COMMUNITY **$125 MILLION**

NUMBER OF TRANSFORMING ENTITIES **94**

624,000 FACILITIES SIZE (SQUARE FEET)

UNIVERSITY BUSINESS INCUBATOR NORTH AMERICAN RANKING **5**

11 ANCHOR TENANTS

EARLY STAGE TENANTS **66**

15 INTERNATIONAL TENANTS

WESTERN DISCOVERY PARK
WESTERN ADVANCED MANUFACTURING PARK

Team

Paul Paolatto – Executive Director

Julia Hoare – Director, Finance & Administration

Jennifer Dawe – Director, Client Services

Terry King – Facilities Manager

Board of Directors

Gitta Kulczycki (Co-Chair), Western University

John Capone (Co-Chair), Western University

Chirag Shah, PwC

Lynn Logan, Western University

Hanny Hassan, Alef Consulting Inc.

Rick Campbell (Advisor), Western University

WESTERN SARNIA-LAMBTON RESEARCH PARK

Team

Tom Strifler – Executive Director

Katherine Albion – Director, Commercialization Centre

Aung Oo – Director, Consulting & Strategic Studies

Caroline Craig – Client Relations Coordinator
– Administrative Receptionist

Doug Rose – Facilities Manager

Ron Listhaeghe – Building Maintenance Operator

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Mayor Mike Bradley (Chair), City of Sarnia

Warden Bev MacDougall, County of Lambton

Deputy Warden Ian Veen, County of Lambton

Judith Morris (Vice Chair), Lambton College

Mark Daley, Western University

Fabrice Orecchioni, BioAmber

Ron Van Horne (Advisor), County of Lambton

John Innes (Advisor), County of Lambton

Peter Hungerford (Advisor), City of Sarnia

George Mallay (Advisor), Sarnia-Lambton Economic Partnership

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