BioTalent Canada

Building skills for Canada's bio-economy

MAPPING POTENTIAL

Profiles of Canada's biotech frontiers

A labour market report
from BioTalent Canada

SUPPORTING REPORT PARTNERS

BIOTALENT CANADA

BioTalent Canada™ is the HR partner of Canada's bio-economy. Our engagement with employers, associations, post-secondary institutions, immigrant serving agencies and service providers has built a dynamic network that is strengthening skills, connecting job-ready talent to the industry and creating opportunities. Visit biotalent.ca for more information.

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President's Message

Biotech – the final frontier? Perhaps. This is the first report of its kind that consolidates provincial and national views of Canada's bio-economy with the input of the real experts – the industry associations that serve the thousands of companies that make up the bio-economy. These provincial and national snapshots are meant to give both a granular and holistic viewpoint on a complex industry, one that employs thousands and has the potential to employ thousands more.

Practically since its inception in 1997, BioTalent Canada has involved itself in facilitating employment in the bio-economy by partnering with government and industry to ensure employers get priority access to the talent that is its lifeblood. This past year marked the most prolific in its history: over 400 students, new graduates, newcomers, and Canadians with disabilities found new employment in over 100 biotech and green economy companies thanks to fresh and innovative placement and wage subsidy programs. A new foray for BioTalent Canada this year was its first venture into work-integrated learning. Over 250 subsidized co-op placements were created last year by our new Student Work-Integrated Learning Program (SWILP), and we will be creating 750 more over the next three years. Programs like these have injected millions of dollars into the industry recently, and with good reason: innovation creates jobs, and biotechnology has the potential to become a major job manufacturer. This will be even more true with the imminent creation of innovative superclusters, several of which will be driven by bioscience.

Along with the regional and national frontiers that make up our dynamic industry, we have also included survey results from the many stakeholders we have served this past year; points of view from employers and wage subsidy participants so that biotech companies across Canada can witness and join in on these innovative programs to access the skills they require from the broadest possible labour pool.

We would like to especially thank the many biotech companies and industry associations whose support made this publication possible. We are gratified that they recognize that with double-digit unemployment among our new science grads nationwide and over 300,000 newcomers entering the country last year alone, small and mid-size companies making up the bulk of Canada's biotech companies require all the help they can get to advance their business objectives and ensure this vibrant industry remains a driver of the Canadian economy.

After all, without people, there can be no science

Rob Henderson,
President and CEO, BioTalent Canada

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CAN'T AFFORD TO HIRE?

GET THE **FUNDS** TO **HIRE** THE **TALENT** YOU NEED

Apply for a Wage Subsidy Today

Call Mary at 1-866-243-2472, ext. 222

biotalent.ca/wagesubsidies

Biotechnology and other companies across Canada can now access new wage subsidies to hire. Get financial help to offset your hiring costs.

BioTalent™ Canada

Building skills for Canada's bio-economy

Snapshots creating an ecosystem

The potential for Canada's bio-economy to make a lasting economic impact can be seen across the country on many frontiers. New graduates working in the industry for the first time are generating more innovation yet still need help getting that first biotech job. Underrepresented groups entering the industry are bringing valuable skills and new perspectives yet still need to overcome barriers. Companies are making ground-breaking discoveries and creating jobs yet need financial resources and talent. Supporting this rich ecosystem through programs, services, superclusters and skills development are post-secondary institutions, national and provincial industry associations as well as BioTalent Canada. This report provides data and snapshots of these supports and initiatives while also highlighting the impacts and opportunities of BioTalent Canada's programs to ensure Canada's bio-economy reaches its full potential.

Canada's bio-economy

The industry in brief

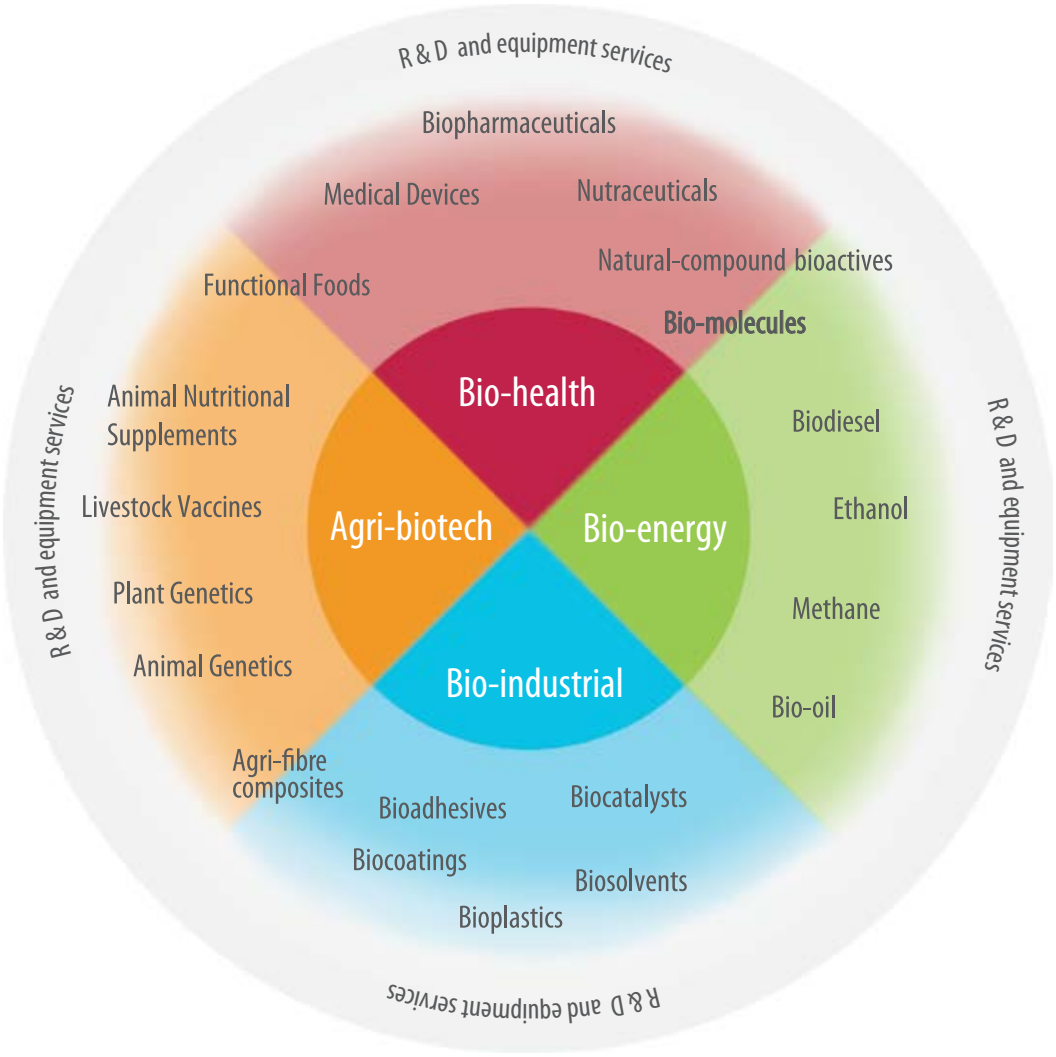
For the purposes of its own activities and mandate, BioTalent Canada defines Canada's bio-economy as largely divided into four sectors (see Figure 1-1). The majority of Canada's biotech companies appear to be concentrating on biotech R&D. Over 80% of Canada's biotech companies are small- or medium-sized enterprises when measured either by number of full-time employees and by total gross revenue. For individuals wishing to enter this sector for the first time, it can be difficult to identify and connect with these companies that are hiring.

Biotechnology itself can be defined as the economic activity associated with the invention, development, production and use of products and processes that are based primarily on biological resources. It includes the use of resources from agriculture, forestry, fishery-based biomass and organic waste. The field is multidisciplinary in that it cuts across health, energy, agriculture, chemicals and materials industries.

Similarly, biotechnology involves the commingling of basic sciences (such as biochemistry, molecular biology, genetics, immunology, microbiology, pharmacology, fermentation, and agriculture) with various engineering fields related to biotechnology applications.

As such biotechnology innovation is a classic example of this sector's contribution to the Canadian knowledge-based economy.

FIGURE 1-1: SECTORS OF THE BIO-ECONOMY AND EXAMPLE PRODUCTS, BIOTALENT CANADA, 2017
Note: Provincial snapshots may vary from this chart based on regional differences and emerging sub-sectors.



Advancing the state of the art

Canada's biotechnology sector is constantly pushing back the frontiers of knowledge. The economic benefits to Canadians from the industry are immense and a key driver of the country's economy, generating demand for a skilled and educated workforce who can meet the industry's challenges as it grows.

Some estimate that as many as 5,000 companies, based on the enclosed snapshots, make up Canada's bio-economy, all working to add to the thousands of discoveries and innovations marked in an industry with a range of subsectors (Fig. 1-1). Biofuels alone have sparked $5 billion in economic activity since 2007[1] while renewable fuel plants pump out upward of $3.5 billion in economic benefits annually. The biofuels subsector has generated over 14,000 jobs and creates over 1,000 more direct and indirect positions a year. Meanwhile, biopharmaceutical activity contributes over $19 billion a year to the economy and directly employs 13,000 people, supporting over 30,000 jobs in total.[2]

Life sciences in Canada rank third in total research and development spending as an economic sector, bested only by aerospace and ICT (Information and Communications Technology).[3]

It is estimated about 51 per cent of the nation's life sciences R&D spending and personnel are found in Ontario.[4]

As the biotechnology industry continues to grow, the need for a talent pipeline to meet the demands of the industry and continue to accelerate economic growth is clear. Education at Canada's world-class academic and research institutions, combined with practical opportunities to gain on-the-job training and experience in industry are both a stellar and underused asset, as BioTalent Canada's data and research suggest.

Employers are keen to help build a skilled workforce that meets their needs, in roles that start with early-career opportunities for students and work placements that lay a strong foundation for careers in biotechnology. They are unequivocal in their enthusiasm for programs and supports that enable them to accelerate these critical skills in workforce development.

[1] *http://ricanada.org/industry/background/, 2017*
[2] *http://www.innovateforlife.ca/, 2018*
[3] *Ibid.*
[4] *https://www.investinontario.com/life-sciences*

BioTalent Canada programs

STUDENT WORK-INTEGRATED LEARNING PROGRAM

Offers up to $7,000 in **co-op wage subsidies** to bio-economy employers to hire students registered in STEM or business programs at Canadian post-secondary institutions.

> This program [Student Work-Integrated Learning Program] has allowed us to increase our workforce beyond what we expected in January 2018. Our managers are now able to project more encompassing project plans and on tighter deadlines due to the projects that the co-op students will take on. They will be doing impactful work for our organization."
>
> – Ashley Cullis,
> Precision NanoSystems Inc.
> (Vancouver, BC)

> The SWILP program has allowed us to hire a talented student in a competitive co-op marketplace. We are looking at ways to further expand our employment of co-op students in the future."
>
> – Eric Bosch,
> DF/Net Software
> (Dundas, ON)

SCIENCE HORIZONS

Offers up to $15,000 in wage subsidies over six months to bio-economy employers to hire a **recent science, technology, engineering, or mathematics (STEM) graduate** into a STEM position with an environmental focus.

OPPORTUNITIES FUND

The ***Opportunities Fund*** wage subsidy program provides up to a maximum of $13,500 towards a salary as an incentive for bio-economy employers to hire, accommodate and train an employee with a disability.

> "This was an amazing opportunity that was a perfect fit for the applicant and the work available at the time. We would have had to forgo the opportunity had it not been for this [Opportunities Fund] support."
>
> – Celina Starnes,
> Stanley Park Ecology Society
> (Vancouver, BC)

> "The Opportunities Fund program has instilled a greater confidence on me, in regard to my employment."
>
> – Aashish Gaurav,
> Opportunities Fund participant
> (Calgary, AB)

CAREER FOCUS GREEN JOBS

Offers up to $13,500 in wage subsidies over six months to employers to hire a **recent graduate from any discipline into a "green job".**

> "As a recent university graduate and young professional, it can be very difficult to find both meaningful and field-related employment. Through this program, I have had the opportunity to work for an organization that I aspired to work for, fulfilling my goal of contributing to positive environmental change in my community."
>
> – Heather Mitchell, Career Focus Green Jobs participant (Winnipeg, MB)

BIOREADY™ PAID INTERNSHIP PROGRAM

Offers up to $11,500 in wage subsidies to bio-economy employers who hire, accommodate and train **Internationally Educated Professionals** to help them better integrate into the bio-economy.

> I became more familiar with various biological technologies and gained knowledge about the biotech industry that I hadn't learnt about in school."
>
> – Paolo Orosa, student participant (Richmond, BC)

BRINGING ESSENTIAL SKILLS TO THE BIO-ECONOMY TALENT POOL

Through this project, curriculum will be developed to improve the essential skills necessary for current Canadian bio-economy employees and help job seekers to be successful in their careers.

> I feel like I not only learned technical skills related to my field of study but also soft skills that will be useful in any future job. These include communication skills both orally and written, organizational skills, and independence."
>
> – Gillian Tanabe, student participant (Vancouver, BC)

For more information on BioTalent Canada's project please visit **biotalent.ca/projects**

Faces of the frontiers

Early-career "green" professional propels organization forward

Young people are playing an instrumental role in developing the future of the bio-economy, and work to bring in more is necessary and welcome, according to a leader at an industry accelerator.

Bioenterprise Corporation, a publicly funded non-profit business accelerator, facilitates the creation, growth and commercialization of agri-technology companies ranging from start-ups to established businesses. It offers a range of services from business analysis and consulting to events that showcase and highlight the sector.

BIOENTERPRISE
Building Ag-Bio Based Businesses

The organization hired a bioproducts analyst and an events and marketing coordinator with the support of BioTalent Canada's **Career Focus Green Jobs** program and hasn't looked back.

"It was a great fit," said Jennifer Kalanda, Marketing Manager at Bioenterprise, explaining that the hires came amid ongoing expansion and growth across the country that the new staff were brought in to facilitate.

"We were opening offices in B.C. and growing our offices in the Maritimes, and our headquarters fields a lot of that growth and national collaboration. We needed to support the growth of our organization and demand for our services," Ms. Kalanda said.

The Guelph, Ontario based organization, with established offices in P.E.I and Nova Scotia and a new one in B.C., met increasing interest in its offerings with the aid of the additional staff.

"The business analyst delivered services to bio-waste industry clients and was "instrumental" in driving a fee-for-service major market research project for a large industry client seeking insight to develop future strategy," said Ms. Kalanda.

The events and marketing coordinator took on all events and partnership management and drove Bioenterprise's digital marketing, including social media and email marketing, increasing presence and engagement by as much as 200 per cent.

"Following their six-month placement and review, we were more than happy to retain them full-time," Ms. Kalanda said.

The support for new hires was crucial to developing the organization and its initiatives, Ms. Kalanda noted. One noteworthy difference between the staff in positions supported by BioTalent Canada funding and co-op students was the ability to build toward sustainable growth, she said.

"With co-op students, the challenge is that you have so little time with them," Ms. Kalanda said. "By month three, you have them to a point where they are self-sustaining, but if they're a four-month co-op, you have to start all over again" from the interview, hire, and training process.

In contrast, being able to hire staff into positions assisted by funding like that provided through BioTalent Canada opens up possibilities for the kind and extent of the work Bioenterprise was able to pursue.

"There is no limit to the time, restrictions to what she can do, and there is continuity, so it is amazing," Ms. Kalanda said, adding that the help of the marketing coordinator on her own team was game-changing.

"I wouldn't be able to do it all without her, anymore," she said, observing that she previously achieved goals with the help of co-op students and "very little sleep."

The BioTalent Canada placements have been so successful that Bioenterprise "routinely" recommends the programs to its own clients, which have created 2,600 jobs and over 1,000 products, and seen $268 million in revenue in the last decade.

"It has been an exceptional experience. We are extremely happy with the program and the staff at BioTalent Canada gave us great guidance," Ms. Kalanda said. "We know our clients are going to get a lot of value out of working with BioTalent Canada as well."

Better bottom line on the horizon due to recent STEM graduates' waste reduction

Two new initiatives that benefit the environment might not exist were it not for BioTalent Canada, according to a senior executive at a biological supply and research company in B.C. that initiated the programs.

Rapidly growing Applied Biological Materials Inc. (ABM) hired interns through BioTalent Canada's **Science Horizons Program** and had them focus on implementing new efforts to reduce packaging and waste both internally and among the company's partners.

Until hiring the new interns, the company's main products -- reagents for the biological research community, including academia and industry focused on cancer and anti-cancer pharmaceutical research and development -- were all shipped in single-use packages to keep them sterile. Adding interns supported by BioTalent Canada funding enabled ABM to implement programs to reduce plastic waste through bulk packaging and to introduce international partners to new ways of thinking about waste.

"It isn't entirely simple to start these projects," said Earnest Leung, Chief Operating Officer at the Richmond, B.C. based company, which has about 100 staff at its 40,000 square foot facility, and another 85 in China. "We might not have done them, to be honest. But given the funding, we decided to implement them sooner than later.

"It gave us push to do things that we had wanted to do but no one had committed real funds to it, or personnel to it. Once they got a person, we dedicated about a third of the time of individual mentors" to work with the interns on the new programs, Mr. Leung said.

The interns were so effective in their roles that ABM sent them to work with distributors.

The efforts were well-placed and have already resulted in a 15 to 20 per cent reduction in shipping costs -- a significant saving for the company with $10 million in annual revenue -- as well as helping distributors and partners to manage waste.

"Everybody knows about the problems with plastics," Mr. Leung said. "They never decompose, they get trapped in the ocean, so there's a lot of issues related to packaging and recycling, and those things aren't usually addressed in places like South America and Eastern Asia. Once we explained to the distributors, they understood."

Beyond the environmental benefits, Mr. Leung noted that the funding fills a vital role in helping to develop Canada's workforce and bring people on as interns before hiring them into full-time positions as ABM did.

"Every time you do hiring, it's a cost and we always want to make sure we make the right choices," Mr. Leung said. "We were able to leverage the funding so we could spend the extra time and teach these people the skills that they need."

The benefits of BioTalent Canada's programs are clear and "well worth the effort" any organization might invest to receive the support, he believes.

"It made a big difference in certain parts of our bottom line. It made certain projects go forward that we had thought about but not implemented yet, and it's a really great way to support youth and people that need a position who want to come out and work for you, but nobody had taken the chance with them," Mr. Leung said.

"People do need a start and I think that this is one of the best ways to help everybody move forward. It's a win-win for everybody."

Wage subsidy program engagement

The enthusiasm for BioTalent Canada's wage subsidy programs reflects great potential for expansion to existing employers and participants who showed strong representation in Ontario and B.C. Expanded involvement throughout Western Canada, Québec and Atlantic Canada show the greatest opportunities for introduction to new employers.

Survey results indicate employers and participants in BioTalent Canada's **Student Work-Integrated Learning Program** (SWILP) universally found the program beneficial. All employer respondents to date say they would participate again (100%) and were satisfied with student performance (100%), while students found value in what they learned (96.2%) and felt better positioned to secure employment in their field as a result of their participation in the program (99.3%).

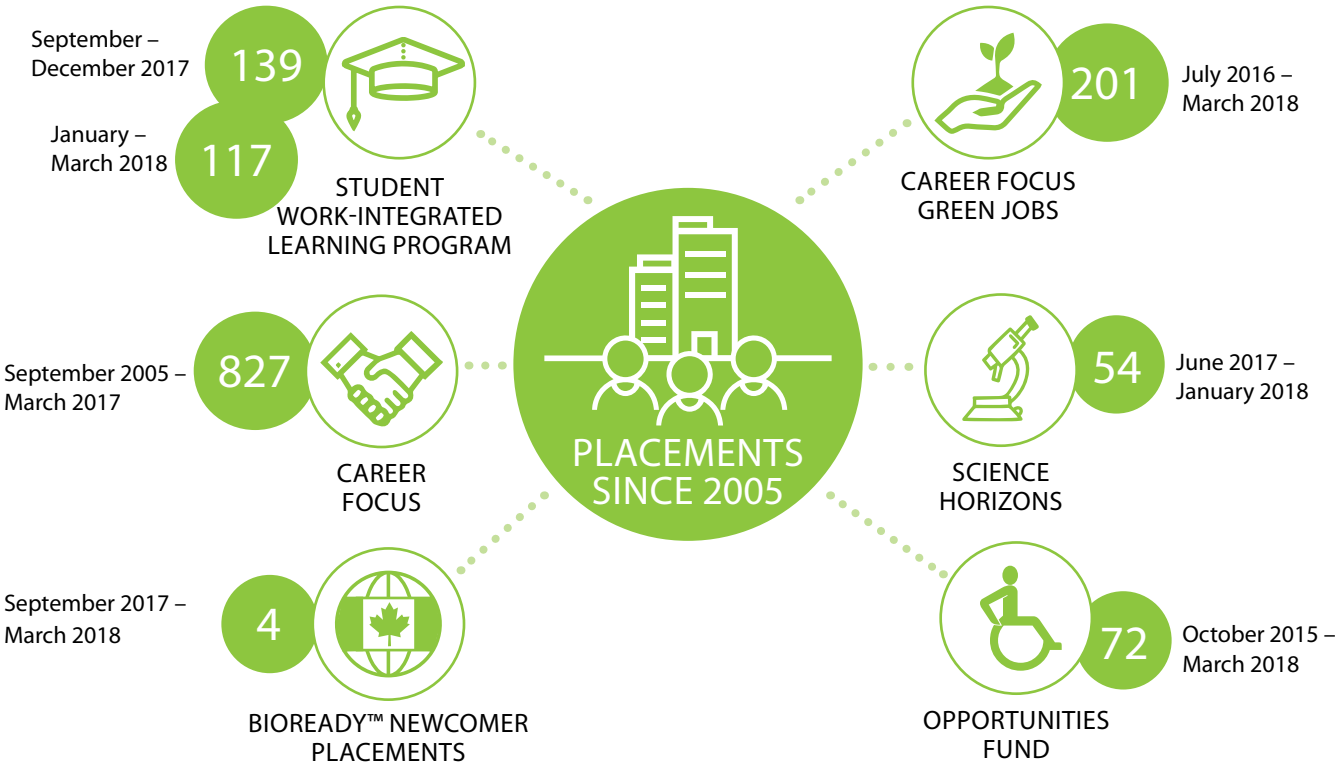
That employer satisfaction rate is also reflected in the ongoing working relationships, with 21 of the participants between September and December 2017 continuing a co-op placement (18) or being hired by the organization (3).

Similarly, all **Opportunities Fund** employer respondents would participate again (100%), while 90.9% of participants found value in their work and were better positioned to secure employment in their field (99.3%).

This success is reflected again in high scores for satisfaction with the **Career Focus Green Jobs** program among employers (98.8%) resulting in the majority of participants being hired (95.2%) after their placement, and 100% interested in participating again. Likewise, participants were overwhelmingly satisfied with the kind of work they received (92.7%) and felt that they gained valuable additional skills (95.8%).

Many BioTalent Canada programs, especially wage subsidies, proving to be popular with employers and participants alike across most sub-sectors.

Wage subsidy growth and expansion



Growth in wage subsidy placements and programs not only reflect employer demand, but also reflect opportunities to develop talent through the Student Work-Integrated Learning Program, especially among women (52.7%) and historically underrepresented groups (41%) such as disabled (2.3%), visible minority (32.4%), Indigenous (2.3%), 1st year students (2.3%) and new Canadians (1.6%).

Under represented talent at-a-glance

Women in biotech

While women are well-represented in the early-career stage (i.e. co-op placements), they find opportunities for advancement wane later in their careers along with a salary gap compounded by fewer chances to develop skills and experience. This was identified in the "Moving Beyond the Boundaries" report along with:

- Seventy-eight (78%) of the female respondents felt overwhelmed with the demands of work, especially older women and those with dependent children. Sixty-two (62%) of the male respondents felt overwhelmed.[5]
- Forty-three (43%) of women surveyed believed that they had been hired or promoted because of their gender, while only 9% of men felt the same way.[6]
- The majority of respondents said they had been affected by a gender pay gap: 42% reporting this to be "somewhat to moderately challenging" and 24% "very to extremely challenging.[7]

This suggests an opening to better support women, promote mentorship and build networks for them. The Student Work-Integrated Learning Program and other programs hope to build a catalyst to help women start their careers with this support.

Newcomers in Canada

Newcomers to Canada, according to the "Paving the Way" report, face serious challenges in finding work in their field (52%) with nearly half citing a lack of Canadian experience as a barrier (47%)[8] so skilled talent is not reaching their potential.

Adding to these barriers is a disconnect between this skilled talent pool and employer needs. There is a strong demand among employers for common skills newcomers possess, namely research and development (58%) and quality control/assurance (24%), which are the skills that rank among the most prominent skills deficits in Canada's bio-economy[9]. To help alleviate this challenge the new BioReady™ Paid Internship Program is focused on connecting employers with newcomers especially because of the known benefits of hiring internationally educated professionals:

52% of employers report improved innovation and/or problem solving.

43% report improved company productivity.

29% report better access to foreign and/or domestic markets.[10]

Potential talent at-a-glance

Career Focus wage subsidies participants (2017)

Career Focus was a wage subsidy program that helped employers hire recent graduates into their first biotech job. This well-educated talent pool provided great potential to the bio-economy with nearly two-thirds (63.1%) of Career Focus participants holding a bachelor's degree and well over one-fifth (22.3%) educated to a master's or PhD level and higher[11]. The lasting impact of this program was that 84.7% of participants were employed full time post-participation.[12]

> "I was able to learn industry practices fairly quickly and was given responsibilities that forced me to learn quickly. I feel more comfortable in my field as a result."
>
> – Miad Fard,
> Career Focus Green Jobs participant
> (Aurora, ON)

[5] *"Moving Beyond the Boundaries: Connecting & Advancing Women in the bio-economy," BioTalent Canada, 2015*
[6] *Ibid.*
[7] *Ibid.*
[8] *Ibid.*
[9] *Ibid.*
[10] *Ibid.*
[11] *Opening the Door II – Building Careers for New Graduates in Biotechnology", BioTalent Canada, 2017*
[12] *Ibid.*

Student Work-Integrated Learning Program (SWILP) at-a-glance[13]

256 PLACEMENTS SINCE PROJECT LAUNCH

241 UNIVERSITY STUDENTS

15 COLLEGE STUDENTS

Post-secondary institutions participation:

- 20 universities
- 5 colleges

Type of placements:

- Co-op placements - 244
- Internships - 7
- Applied research projects - 5

PARTICIPANT ENGAGEMENT

- 98.5% were satisfied with the overall experience
- 99.3% felt they were better positioned to secure employment in their field

21.5 YEARS AVERAGE AGE

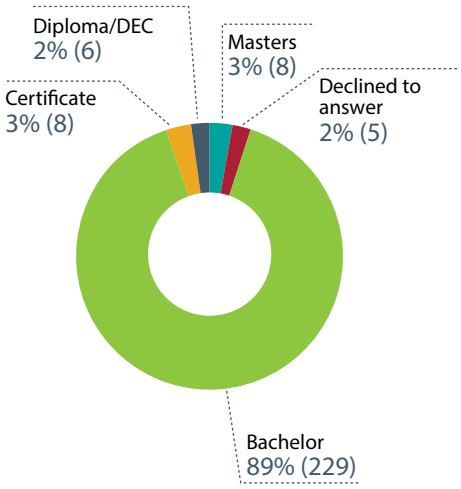
$32,655/YEAR AVERAGE SALARY

100% FULL-TIME STUDENTS

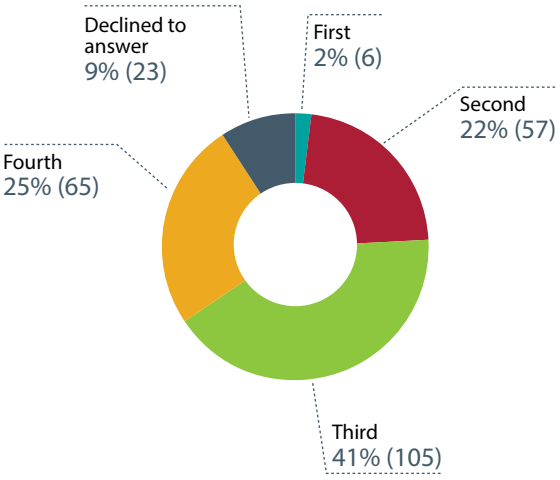
AREA OF STUDY

- 95.7% STEM (244)
- 3.9% business (10)
- 0.4% both (1)

Level of education



Year of study



[13] *Student Work-Integrated Learning Program participant applications, BioTalent Canada 2017*

PARTICIPANTS FROM UNDERREPRESENTED GROUPS

Participants by gender:

135 FEMALES

119 MALES

2 DECLINED TO ANSWER

55% of participants (i.e. female, 1st year student, person with disability, visible minority, Indigenous, new immigrant)

Visible minority:
- No – 154
- Yes – 83
- Declined to answer - 19

Self-identified disability:
- Agility – 2
- Hearing – 2
- Learning – 2
- ADHD – 1

New immigrant:
- No – 243
- Yes – 4
- Declined to Answer – 9

Self-identified Indigenous Group:
- Metis – 1
- Non-status – 5
- Declined to answer - 251

EMPLOYER ENGAGEMENT

92 employer participants

Average number of placements per employer - 2.8

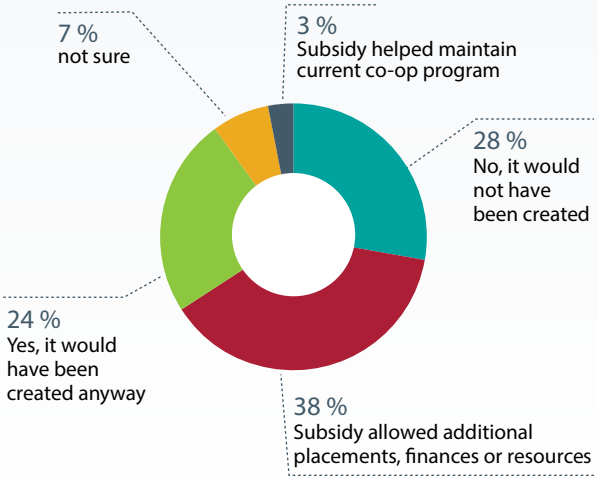
Average number of co-op roles per employer - 2.6

- 100% would participate again
- 100% satisfaction
- 97.75% would continue the collaborative relationship with the post-secondary institution

Employers by sector

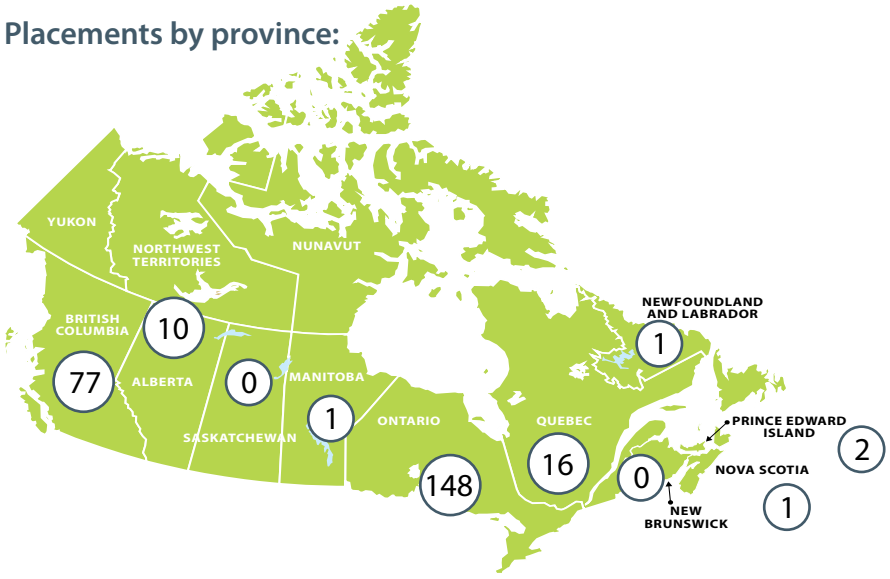
- Bio-health - 195
- Bio-energy - 3
- Bio-industrial - 19
- Agri-biotech – 17
- Non-biotech* – 22

Would the co-op position have been created without the SWILP subsidy?



*While 22 of the participants indicated that they are non-biotech organizations, the figure and categorization itself is somewhat misleading. The work of these institutions, while not strictly or directly producing biotechnology, all work in related or industry supporting and facilitating fields. Some examples include information technology and high-performance computing or software for genomics, neuroscience and academic research; research on cancer and ethics, chemicals and equipment for multiple industries that include biotechnology, and sector regulatory and policy analysis.

Placements by province:

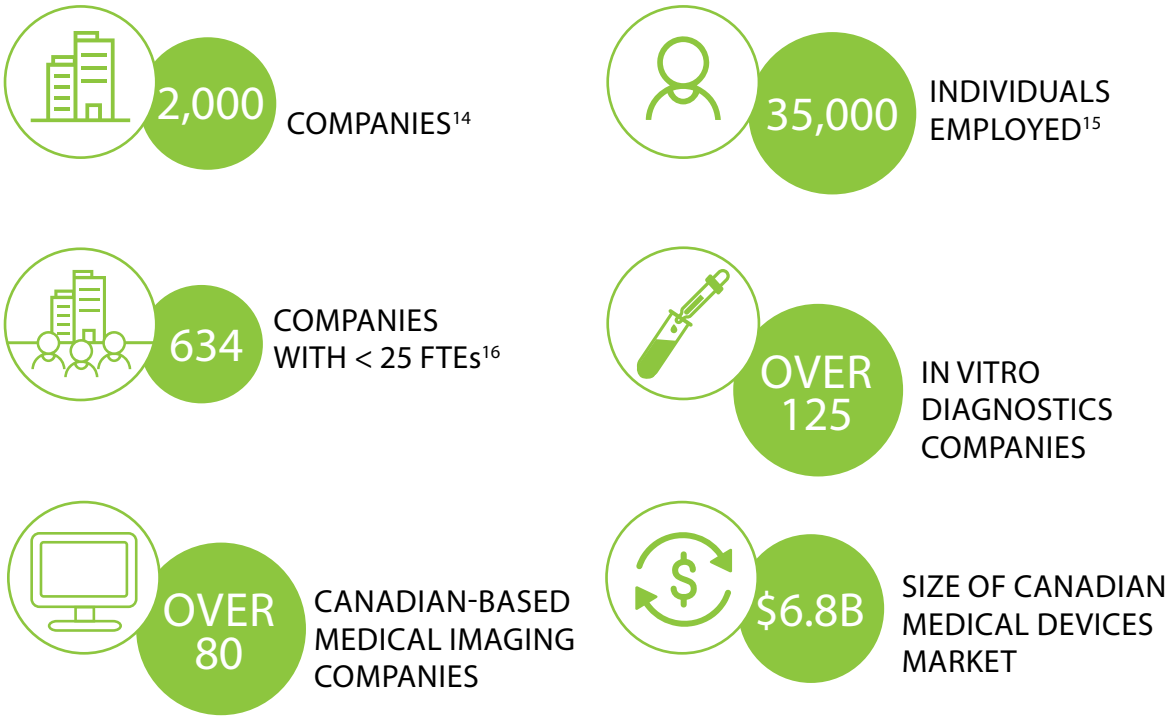


While student placements happened across Canada with a high concentration in Ontario and Québec there is even more potential for the bio-economy in the initiatives and growth highlighted in the following snapshots.

BIOTECHNOLOGY SNAPSHOT

Medical Technologies

Vital elements



[14] *Canadian Trade Commissioner Service, 2018*

[15] *MEDEC, 2018*

[16] *BMI Research, 2018*

MEDEC

CANADA'S MEDICAL TECHNOLOGY COMPANIES
LES SOCIÉTÉS CANADIENNES DE TECHNOLOGIES MÉDICALES

Industry information provided by MEDEC.

Overview

From the discovery of the world's first home-based dialysis therapy, to the Medical Radio Frequency Puncture Generator to treat newborns with heart defects, Canadian medical device companies are transforming the lives of patients, here and abroad, and supporting the long-term sustainability of Canada's healthcare system. Innovations in medical devices provide benefits for patients and the health system, including: less invasive procedures, extended and improved quality of life, reduction in hospital stays or in other facilities, earlier and more accurate diagnosis of disease, and improved patient safety.

Canada's medical devices sector is highly diversified, R&D intensive, technology-based and export-oriented; purchasers include hospitals, physician's offices, laboratories, clinics and patients, and firms spend, on average, 12 percent of yearly revenues on development, design and commercialization.[17]

Sector and Subsector

Bio-health

- Medical devices

Why Canada for medical technology

- Canada's workforce is the most highly educated among members of the Organization for Economic Co-operation and Development (OECD), with half of its working-age population having a tertiary level education.[18]
- Canada also produces over 5,000 new doctoral graduates per year and over 50% of these doctorates are in the fields of science and engineering.[19]
- This ranks Canada 5th in the world per capita for the development of high-level science and engineering talent.[20]

Current initiatives and highlights

Québec's Life Sciences Strategy has four key objectives: increased investment in research and innovation; fostering the creation of innovative companies; attracting new private investment; and the further integration of innovation into the health and social services network.

Ontario's Office of the Chief Health Innovation Strategist (OCHIS) – Led by Bill Charnetski, this is the first such office in Canada devoted to increasing the adoption of medical technologies in Ontario's health care system and growing Ontario-based companies. The OCHIS is leading initiatives such as the Health Technologies Fund, Innovation Brokers and the Value-Based Innovation Program.

Alberta's Strategic Clinical Networks (SCNs) – Based on the identified needs of the SCNs, Alberta Innovates (AI) and MEDEC developed a process that paired potential existing health technology innovations to those needs, and have co-developed programs to validate the solutions in a real-world setting within Alberta.

[17] *Industry Canada, 2018*

[18] *Government of Canada Trade Commissioner Service, 2018*

[19] *Ibid.*

[20] *Ibid.*

Innovation and growth

Canada has strengths in interventional imaging, software development, and advanced imaging components. Canadian companies have developed leading-edge expertise in ultrasound, medical x-ray technologies, MRI and fluorescence-based interventional imaging technologies for medical diagnosis and treatment.

Numerous firms across Canada develop and market specialized medical imaging software for digital health applications as well as for image archiving, transmission, visualization and analysis. Key clusters exist throughout Canada in Toronto/Kitchener/London, Montréal, Vancouver, Calgary and Halifax.

Growth companies

PROFOUND MEDICAL

Profound Medical is a medical device company that has developed a unique and minimally invasive treatment to ablate the prostate gland in prostate cancer patients.

synaptive

Synaptive Medical's integrated BrightMatter™ solutions - including surgical planning, navigation and visualization, and an informatics platform—are designed to give clinicians the right information they need to ensure the best possible outcomes for patients.

Baylis MEDICAL

Baylis Medical develops and markets high-technology medical devices used in the fields of interventional cardiology, interventional radiology, and spinal procedures. The company continues to expand its Mississauga operations.

Looking ahead

> The support received to harness the talent needs of growing companies through initiatives like the Student Work-Integrated Learning Program are creating the capacity to make Canada a leading jurisdiction for innovators."
>
> – Brian Lewis, President and CEO, MEDEC

About MEDEC

Established in 1973, MEDEC is the national association representing Canada's innovative medical technology (medtech) industry. Representing approximately 150 medtech companies (ranging from Canadian-owned to multinationals), MEDEC works closely with the federal and provincial-territorial governments, health professionals, patients and other stakeholders to deliver a patient-centred, safe, accessible, innovative and sustainable, universal healthcare system supported by the use of medical technology. MEDEC is governed by a Board of Directors representing the diverse perspectives and experiences of its members from across the country.

Address and contact information

MEDEC - Canada's Medical Technology Companies
MEDEC - Les sociétés canadiennes de technologies médicales

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Social media

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BIOTECHNOLOGY SNAPSHOT

British Columbia

Vital elements

1,154 COMPANIES[21]

11,172 DIRECT EMPLOYMENT[22]

14,000 TOTAL ESTIMATED EMPLOYMENT[23]

OVER 350 POST-SECONDARY INSTITUTIONS

More than 350 private institutions[24]

- 25 public institutions
- 50 private language schools
- 40 aboriginal controlled institutes
- 300 private career training institutions
- 20 private and out of province public degree granting institutions
- 16 seminaries and theological colleges[25]

50 RESEARCH CENTRES[26]

APPROX. 21 INCUBATORS / ACCELERATORS[27]

$805 MILLION IN REVENUE[28]

$14.4 BILLION GDP CONTRIBUTION TO BC[29]

[21] *https://www.britishcolumbia.ca/invest/industry-sectors/technology/life-sciences/, 2018*
[22] *Ibid.*
[23] *https://www.britishcolumbia.ca/TradeBCPortal/media/Marketing/bclifesciences-mit.pdf, 2018*
[24] *https://news.gov.bc.ca/factsheets/private-post-secondary-institutions-in bc, 2018*
[25] *http://www.bcbc.com/pdfs/BC2035-Feb17-FINAL.pdf*
[26] *https://www.britishcolumbia.ca/TradeBCPortal/media/Marketing/bclifesciences-mit.pdf, 2018*
[27] *http://www.venturelabs.ca/resource_category/bc-incubators-accelerators/, 2018*
[28] *http://bcbudget.gov.bc.ca/2017/stplan/Strategic_Plan_2017-18_2020-21.pdf*
[29] *https://www.britishcolumbia.ca/invest/industry-sectors/technology/life sciences/*

LifeSciences British Columbia

Industry information provided by LifeSciences British Columbia.

Overview

Life sciences is defined by the scientific study of living organisms. The sector includes multiple industry verticals such as medical and digital technology, device manufacturing and is known as a global leader in antibody research and discovery. LSBC's membership is comprised of over 200 organizations and individuals across a wide array of businesses that support life sciences and businesses with a specific focus on: (1) Research, Testing, and Medical Laboratories, (2) Drugs and Pharmaceuticals, and (3) Medical Devices and Equipment.

Sectors and Subsectors

Bio-health

- Medical devices
- Biopharmaceuticals
- Nutraceuticals
- Natural-compound bioactives
- Bio-molecules

Why British Columbia

- BC has been recognized as being the #1 start-up ecosystem in Canada[30]
- Vancouver is the 3rd most liveable city in the world[31]
- 3rd greenest city in the world[32]
- B.C. has the lowest provincial personal income taxes in Canada for individuals earning up to $125,000[33], with a general corporate income tax rate of 12% and 2% Small Business Corporate tax
- Of all Canadian provinces, we have "the largest trading relationship with Asia"[34] and the most cost competitive talent around[35]
- Our life sciences sector has strong ties with all of BC's post-secondary institutions and has access to a $100 million-dollar Venture Capital Fund from the province[36]

Current initiatives and highlights

- BC awarded the digital technology supercluster allowing it to access $950 million in federal funding matched dollar for dollar by the private sector, to advance innovations in precision health, manufacturing and environment technologies.
- Arbutus Announces Closing of the Second Tranche of a $116M Strategic Investment from Roivant Sciences
- Signed MOU agreement establishing the Cascadia Venture Acceleration Network. This partnership of incubators, accelerators, universities, investors and industry associations have pledged to work collaboratively in support of entrepreneurs and researchers across British Columbia, Washington state and Oregon.
- Zymeworks Announces License Agreement with Johnson & Johnson Innovation to Develop and Commercialize Next Generation Bispecific Antibody Therapeutics worth $US1.45 Billion

[30] *http://www.vancouvereconomic.com/blog/vecs_take/vancouver-canadas 1-startup-ecosystem/, 2018*
[31] *https://www.economist.com/blogs/graphicdetail/2016/08/daily-chart-14, 2018*
[32] *http://www.vancouvereconomic.com/vancouver/greenest-city/*
[33] *https://www.britishcolumbia.ca/TradeBCPortal/media/Marketing/bc lifesciences-mit.pdf*
[34] *https://investmentmonitor.ca/sites/default/files/2017-05/APF%2 Investment%20Monitor%20Report%202017%20(optimized).pdf*
[35] *https://bctechstrategy.gov.bc.ca/app/uploads/sites/10/2017/03/bc lifesciences-web.pdf*
[36] *https://assets.kpmg.com/content/dam/kpmg/ca/pdf/2016/10/BC-tech report-card-FY16.pdf*

Innovation and growth

Innovative and growth areas in the life sciences industry exist in technology aimed at providing patient centric services long before a patient walks into a hospital. Progress in this area is supported by research in precision health, antibodies, precision medicine, digital health and medical devices. Emerging technologies that will be crucial in integrating the ecosystem and protecting patient data include Artificial Intelligence, Blockchain and AR/VR (Augmented and Virtual Reality). Lastly, it will be interesting to keep an eye on the fast-growing medical marijuana / cannabis sector and its application in healthcare.

Growth companies

STEMCELL Technologies is one of Canada's largest biotech firms and develops stem cell tools for researchers across the world. STEMCELL is a recognized leader in cell culture media and cell separation products.

Zymeworks is a world leader in the field of bispecific antibodies and bispecific antibody-drug conjugates (ADCs) and is developing a portfolio of therapeutics candidates for the treatment of cancer and autoimmune diseases.

Aspect is recognized as a world leader in 3D bioprinting and tissue engineering, a trend that is growing rapidly in the life sciences sector globally.

Looking ahead

> Industry Leaders often express concerns over the availability of talent. A pressing immediate need is for a pool of senior executives to meet existing demands as well as managing for future growth."
>
> – Lesley Esford, Ph.D. President & CEO, LifeSciences British Columbia

About Life Sciences British Columbia

LifeSciences BC is a not-for-profit, non-government, industry association that supports and represents the life sciences community of British Columbia through leadership, facilitation of investment and partnering, advocacy, and promotion of our world-class science and industry. Life sciences sectors, from bio-pharmaceuticals and medical technology, to digital health and medical devices, are integrated into our organization and all that we do, ensuring that no life sciences sector is working in isolation and that all sectors come together in a comprehensive, complementary and coordinated fashion.

List of services

- Advocacy
- Events
- Community Building
- Policy
- Industry Research

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www.facebook.com/lifesciencesbc

BIOTECHNOLOGY SNAPSHOT

Alberta

Vital elements

230 COMPANIES[37]

3,808 INDIVIDUALS EMPLOYED[38]

205 COMPANIES WITH < 50 FTEs

25 COMPANIES WITH > 50 FTEs[39]

24 AVERAGE NUMBER OF PEOPLE EMPLOYED BY COMPANIES[40]

COMPANIES PER SUBSECTOR[41]*

- Bio-health:
  - 59 Biopharmaceuticals
  - 91 Medical devices
- 20 Bio-energy
- 38 Bio-industrial
- 57 Agri-biotech

21 PUBLIC POST-SECONDARY INSTITUTIONS

5 INDEPENDENT POST-SECONDARY INSTITUTIONS[42]

1 GOVERNMENT INNOVATION POWERHOUSE ACROSS 4 BIOTECHNOLOGY RESEARCH AREAS[43]

33 BUSINESS INCUBATORS[44]

$662 MILLION REVENUE GENERATED BY THE SECTOR IN 2016[45]

1,179 ADVANCED DEGREE HOLDERS CURRENTLY EMPLOYED IN LIFE SCIENCES INDUSTRY[46]

- 593 PhD degree holders
- 586 Master's degree holders

[37] Deloitte LLP and BioAlberta, "Life sciences in Alberta: State of the industry 2017"
[38] Ibid.
[39] Ibid.
[40] Ibid.
[41] Ibid.
[42] Alberta Advanced Education, "Publicly Funded Institutions," 2018
[43] Alberta Innovates, "Our Focus Areas," 2018
[44] Alberta Agriculture and Forestry, "Business Incubators in Alberta and Canada," n.d.
[45] Deloitte LLP and BioAlberta, "Life sciences in Alberta: State of the industry 2017"
[46] Ibid.
** Sum exceeds total number of companies as survey respondents were able to self-classify in more than one sub-sector*

Industry information provided by BioAlberta.

Overview

The life sciences industry in Alberta is filled with opportunity and advances in the realms of research, innovation, and economic diversification. The industry is rapidly growing, whereby continual increases in research and development spending, and capital raised by companies are laying the foundation for the development and commercialization of new products and services. The industry is also a key source of growth in Alberta's knowledge economy, attracting a large number of PhD and Master's Degree holders, along with other highly qualified personnel. With a dynamic mix of large and small players that are diverse in their end markets, the industry is expected to continue to contribute to sustainable economic growth and prosperity in Alberta.

Sectors and Subsectors

Bio-health

- Medical devices
- Nutraceuticals
- Bio-molecules
- Biopharmaceuticals
- Natural-compound bioactives

Bio-energy

- Biodiesel
- Methane
- Ethanol
- Bio-oil

Bio-industrial

- Biocatalyst
- Bioplastics
- Bioadhesives
- Biosolvents
- Biocoatings

Agri-biotech

- Agri-fibre composites
- Plant genetics
- Animal nutritional supplements
- Animal genetics
- Livestock vaccines
- Functional foods

Why Alberta

- Innovative and entrepreneurial culture
- Appealing tax credit programs that attract investment
- Competitive corporate tax rates, low personal taxes
- Labour force consisting of 2.5 million workers
- High labour force participation, an educated population, and high labour productivity
- Modern infrastructure to support business development and growth
- Government support to attract venture capital and increase business start-ups and the commercialization of Alberta ideas
- High government research and development expenditures

Current initiatives and highlights

In Alberta, there exists a cooperative and ever-growing relationship between industry and government. One initiative that demonstrates the strength of this partnership is a Memorandum of Understanding (MOU) between the Government of Alberta and the innovative pharmaceutical industry. Signed in June of 2017, this collaboration fuels future growth in the health system by creating conditions that attract investment and expertise, providing local enterprises with improved access to health data, and supporting the commercialization of discoveries by small and medium-sized enterprises.

Supporting companies in building connections with new customers, new partners, and new investors is a key initiative of industry associations in the province. Accordingly, with the goal of helping companies connect to new markets, BioAlberta created a directory of the provincial bio-industrial sector in 2017.

More generally, government-funded projects continue to create appealing investment environments to support all sub-sectors within the life sciences industry in Alberta. One key projects is the Alberta Innovation Tax Credit, with $90 million in funding allocated over the 2017-2020 period to assist companies in securing investment in high-tech sectors. In 2017, legislation was also passed for the Capital Investment Tax Credit program, offering tax credits to businesses in support of scaling-up efforts.

Innovation and growth

The majority (64%[47]) of life sciences companies in Alberta operate in medical technology and devices, and health biotechnology and biopharmaceuticals. Meanwhile, functional foods and natural health products reported the largest growth, as the focus of 19% of companies in 2017, up from 7% in 2015.[48] Health therefore continues to lead in research and growth, where emerging research focuses include precision medicine and health to home aging. Still, researchers and entrepreneurs are making ground breaking discoveries in agri-biotech, bio-energy, and bio-industrial sub-sectors, where hemp is among the emerging research areas.

Growth companies

BioNeutra North America Inc. is an award-winning company that developed VitaFiber™ IMO, a low calorie, natural sweetener that is both a prebiotic and dietary fibre. The product is approved for sale in 30 countries.

Parvus Therapeutics Inc. With a lead Navacim for treating type 1 diabetes, Parvus Therapeutics is growing under a collaboration agreement with Novartis. Parvus is developing multiple Navacims that target autoimmune diseases.

Metabolomic Technologies Inc. is providing leadership in improving cancer detection and prevention. They created PolipDx™, an easy-to-use urine-based test that provides sensitive detection of adenomatous polyps, the precursor to colorectal cancer.

[47] Deloitte LLP and BioAlberta, "Life sciences in Alberta: State of the industry 2017"
[48] Ibid.

Looking ahead

> "The way we're really going to diversify and grow the Canadian economy is to be deliberate about increasing investments in industries that we have a comparative advantage in, such as natural resources, and increasing investments in those we wish to develop a competitive advantage in, such as science, technology, innovation and people."
>
> – Mel Wong, President and CEO, BioAlberta

About BioAlberta

BioAlberta is a member-driven association that represents and promotes the province's vibrant and diverse life sciences industry. Through partnerships and collaborations, the organization is dedicated to promoting Alberta's life science sectors, locally, nationally and internationally. The association operates under three strategic areas: advocacy; promotion, marketing and networking; and industry development. BioAlberta enables members' success through the provision of networking and educational events, and the effective delivery of policy options to governments.

List of services

- Cost-saving services on: lab equipment and materials; human resources and public relations services; select national and international conferences; home, auto and director's liability insurance; and various other expenses, such as hotel and car rentals
- Network connections through: free admission to numerous networking events; increasing networks of contacts to sources of capital; opportunities to participate on BioAlberta committees and drive member activities; and access to employee recruitment tools
- Updates on industry news via: BioAlberta emails, website updates, and industry reports and resources; regulatory and policy information; and "Members only" intelligence reports
- Opportunities to drive the BioAlberta agenda through working groups
- Small business support for growth through access to BioAlberta's office facilities and access to advisory financial assistance

Address and contact information

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Social media

- @Bioalberta
- BioAlberta (Alberta Biotechnology Association)
- BioAlberta

Saskatchewan

Vital elements

BioScience Scorecard 2015

- **141** PRIVATE COMPANIES/ INSTITUTIONS/ GROWER ORGANIZATIONS
- **1,923** POST-SECONDARY ENROLMENT IN BIOSCIENCES (UNIVERSITY & POLYTECHNICAL)
- **36** PATENTS ISSUED (annual-SK origin - 2014)
- **$26.8 MILLION** PROVINCIAL GOV'T. BIOSCIENCE R&D INVESTMENT
- **$33.5 MILLION** PRODUCER ORGANIZATION R&D INVESTMENT
- **$313.8 MILLION** TOTAL AG BIOSCIENCE R&D FUNDING
- **1,509** PUBLIC EMPLOYMENT (FULL TIME PERMANENT)
- **448** PRIVATE EMPLOYMENT (FULL TIME PERMANENT)
- **536** JOURNAL ARTICLES PUBLISHED (annual - SK origin - 2014)
- **$3.65 BILLION** CONTRIBUTION TO PROVINCIAL GDP
- **$83.1 MILLION** PRIVATE SECTOR R&D INVESTMENT
- **$170.4 MILLION** PUBLIC SECTOR R&D FUNDING
- **3** POST-SECONDARY INSTITUTIONS

Innovation Place, Saskatchewan Data

- 49 companies
- 1,024 individuals employed
- 47 companies with < 50 FTEs
- 2 companies with > 50 FTEs
- companies per subsector
  - 10 bio-health
  - 2 bio-energy
  - 2 bio-industrial
  - 35 agri-biotech

Industry information provided by Ag-West Bio Inc

Overview

Saskatchewan is a leader in agricultural biotechnology, with world-class expertise in crop and livestock development, genomics, imaging, and vaccine research. A research cluster centred at the University of Saskatchewan campus and Innovation Place technology park in Saskatoon includes Agriculture and Agri-Food Canada, the Canadian Light Source synchrotron; Global Institute for Food Security, Global Institute for Water Security, National Research Council Canada, POS Bio-Sciences, Saskatchewan Research Council, the Toxicology Centre, and VIDO-InterVac (a level 3 vaccine R&D containment facility); and the Saskatchewan Food Industry Development Centre.

This research capacity, along with support from groups like Ag-West Bio, Genome Prairie, Natural Products Canada and Saskatchewan Health Research Foundation, is enabling the growth of new companies around the province.

Sectors and Subsectors

Bio-health
- Medical devices
- Nutraceuticals
- Bio-molecules
- Biopharmaceuticals
- Natural-compound bioactives

Bio-energy
- Biodiesel
- Methane
- Ethanol
- Bio-oil

Bio-industrial
- Biocatalyst
- Bioplastics
- Bioadhesives
- Biosolvents
- Biocoatings

Agri-biotech
- Agri-fibre composites
- Plant genetics
- Animal nutritional supplements
- Animal genetics
- Livestock vaccines
- Functional foods

Why Saskatchewan

- Saskatchewan is a leading centre for ag-biotech R&D in Canada
- World-class research cluster that includes the Canadian Light Source synchrotron, Vaccine and Infectious Disease Organization-International Vaccine Centre, and Global Institute for Food Security
- Highly-trained personnel, including graduates from University of Saskatchewan, University of Regina, and Saskatchewan Polytechnic, as well as international recruits
- Expertise in crop and livestock development, genomics, imaging and soil health

Current initiatives and highlights

Saskatchewan is renowned for producing some of the world's best grains, and for its important role in the development of canola, Canada's most valuable crop. More recently, pulse crops have come to the fore, and Saskatchewan provides most of Canada's export product.

Diversifying crops is the theme of one initiative, adding research to smaller, but high-potential crops like mustard, flax, hemp, camelina, canary seed, sunflower and quinoa.

A growing interest in plant protein has led to the development of the recently announced Protein Industries Canada Supercluster. This pan-prairie initiative promises to build on the region's crop R&D strengths to "unleash the potential of Canadian crops," with a strong focus on value-added processing and product development.

Saskatchewan is also an important player in the Protein Highway, a Canada-US consortium to take advantage of the prairie provinces' and northern states' strengths in this area.

In this era of climate change, dealing with greenhouse gas emissions is an important topic. Zero-till farming sequesters carbon and adds nutrients to the soil. Saskatchewan researchers are gaining a better understanding soil microbes and plant roots to improve fertilizer efficiency. As well, advances in digital technology will lead to more efficient and sustainable food production.

Innovation and growth

Saskatchewan has earned a reputation as the most vibrant ag-bioscience research, development and commercialization hub in Canada. Going forward, advanced research in plant imaging, water and food security, microbial biotechnology and the application of genomics tools in plant breeding is producing new innovations. Protein, food ingredient processing, and fractionation is bringing further innovation. Digital agricultural technology is transforming decision making by combing large data collection with artificial intelligence tools, further supported by new crop and machine sensor technologies. Saskatchewan is leading the convergence of biology and computer science in the quest to produce nutritious food efficiently, safely and sustainably.

Growth companies

Bioriginal
Innovative EFA Solutions

Bioriginal Food & Science Corp. is a world leading provider of innovative essential fatty acid (EFA) solutions for various market sectors including nutraceuticals and functional foods. Bioriginal is instrumental in omega research, writing monographs and setting standards for the omega segment within the health food industry.

CanniMed®

CanniMed® Ltd. has provided Canadian patients with access to a standardized and trusted supply of pharmaceutical-grade cannabis since 2013. Sales in 2017 were $16.7 million, 70% higher than 2016, due to product consistency from over a decade of development in line with pharmaceutical manufacturing standards.

Nutrien™

Nutrien Ltd. is the world's largest provider of crop nutrients, inputs and services, formed through the merger of Agrium and PotashCorp. Nutrien sells over 25M tonnes of potash, nitrogen and phosphate products annually. With over 1,500 retailers, nearly 20,000 employees, and investments and operations in 14 countries.

Looking ahead

> With expertise in crop and livestock science, digital technologies, and sustainable production, Saskatchewan will play a significant role in achieving the federal goal of increasing agri-food exports from $50B to $75B by 2025."
>
> – Wilf Keller, President and CEO, Ag-West Bio Inc.

About Ag-West BIO

Ag-West Bio is Saskatchewan's bioscience industry association and catalyst for industry growth. Our goal is to move research to market and grow biobusiness in the province. Membership-based, we support commercialization of technologies in the areas of sustainable crop production, value-added food processing, health, environment and bioproducts. We aid strategic alliances, provide seed capital for early-stage businesses, and disseminate information. Entrepreneurs come to Ag-West Bio for pathfinding and help in creating sound business plans. Our many events help create connections between research and business and build a sense of community. Ag-West Bio is funded by the Saskatchewan Ministry of Agriculture and Agriculture & Agri-Food Canada, with support from Western Economic Diversification Canada and the National Research Council's Industrial Research Assistance Program.

Address and contact information

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BIOTECHNOLOGY SNAPSHOT

Manitoba

Vital elements

162 COMPANIES

5,607 INDIVIDUALS EMPLOYED

141 COMPANIES WITH < 50 FTES

21 COMPANIES WITH > 50 FTES

COMPANIES PER SUBSECTOR

- Bio-health
  - 29 Medical devices
  - 26 Biopharmaceuticals (therapeutics, biologics, consulting)
  - 23 Nutraceuticals (functional foods, nutraceuticals, consulting)
  - 6 Natural-compound bioactives
  - 13 Digital Health
  - 18 diagnostics
  - 3 consulting
- 6 Bio-energy
- 8 Bio-industrial
- Agri-biotech
  - 6 plant genetics
  - 2 livestock vaccines
  - 5 animal nutritional supplements
  - 15 crop inputs
  - 2 agriculture biotech

12 POST-SECONDARY INSTITUTIONS

11 RESEARCH ORGANIZATIONS

3 INCUBATORS

$2.5 BILLION REVENUE GENERATED BY THE SECTOR

Industry information provided by Bioscience Association of Manitoba

Overview

The bioscience industry in Manitoba has a revenue exceeding $2.5 billion and employs more than 5,600 FTE's. The industry generated 82% of this revenue from export, with their two primary markets being Canada excluding Manitoba (42%) and the United States (31%).

Manitoba is Western Canada's largest pharmaceutical manufacturing centre, with Valeant Pharmaceuticals, Pfizer, Emergent BioSolutions, and Vita Health Products being major contributors. Manitoba's agriculture industry is also a key contributor to both the sector and the economy. In addition to the considerable opportunities presented by the increased demand for plant protein; Manitoba is internationally recognized as a leader in the functional foods and nutraceutical space. The functional food and nutraceutical space is expected to continue to grow with the recent plant protein supercluster announcement in February 2018.

Manitoba bioscience companies have developed solutions to reduce negative impacts on the environment. Efforts in this space are primarily aimed at alternative energy sources, improving sustainability and protecting the environment.

Sectors and Subsectors

Bio-health
- Medical devices
- Nutraceuticals
- Bio-molecules
- Biopharmaceuticals
- Natural-compound bioactives

Bio-energy
- Biodiesel
- Bio-oil
- Ethanol

Bio-industrial
- Biocatalyst
- Biocoatings
- Bioplastics
- Bioadhesives

Agri-biotech
- Agri-fibre composites
- Plant genetics
- Animal nutritional supplements
- Animal genetics
- Livestock vaccines
- Functional foods

Why Manitoba

- 5,607 full-time employees in bioscience sector (highest concentration per capita in Canada)
- 179 businesses engaged in bioscience industry
- $39 million expenditures in R&D in 2016
- Among the lowest electricity rates in North America
- #1 Cost-Competitive City (Western Canada and U.S) in Biotechnology R&D[49]
- Six government programs support the bioscience sector
- 10,000+ post-secondary graduates
- 58% of bioscience employees in Manitoba have post-secondary education
- 39% of bioscience employees in Manitoba hold a Bachelor's, Master's, or PhD degree

Current initiatives and highlights

***Western Economic Diversification Canada Funding for Clean Tech*:** $1.5M to deliver an international market access program for the Western Canadian clean-tech bio-industry.

Protein Innovations Canada (PIC): a successful industry led supercluster comprised of leading Canadian agriculture technology corporations, food and food ingredient manufacturers, agriculture and food service companies, economic development agencies, and highly experienced academic and financial institutions.

Valeant Pharmaceuticals, Pfizer, Emergent BioSolutions and Vita Health Products are major contributors to the sector and represent **Western Canada's largest pharmaceutical manufacturing centre.**

[49] *KPMG 2016*

Innovation and growth

Bioscience research and innovation in the biosciences in Manitoba is diverse encompassing Bio-Health, Ag Biotech, and Industrial Biotech.

Researchers at the Canadian Science Centre for Human and Animal Health, Canada's only Biosafety Level 4 laboratory, are developing therapies for the most efficacious pathogens in the world including HIV, Ebola, and more.

Manitoba companies involved in research are working on incorporating big data into decision making at the farm level. Companies such as Farmers Edge are creating precision ag applications to increase production.

In the functional foods and nutraceutical space, groups such as the Richardson Centre for Functional Foods and Nutraceuticals (RCFFN), the Canadian Centre for Agri-Food Research in Health and Medicine (CCARM), and the Manitoba Agri-Health Research Network (MAHRN) are all working to improve health through food.

Growth companies

Farmers Edge, in September of 2017, won the Startup Canada Global Entrepreneurship Award. Farmers Edge now operates in five countries across the globe and employs more than 450 staff.

Medicure's net revenue has increased over 10X since 2012. Obtained exclusive license for an additional FDA approved cardiovascular therapeutic in addition to their primary therapeutic AGGRASTAT.

The Winning Combination won emerging company award in 2017 at the CME Gala - Kaizen and Bodylogix, premium supplements for active lifestyles, which are distributed across Canada, the United States and in select international markets.

Looking ahead

> The Manitoba bioscience industry is growing at an unprecedented rate of over 20%. With a continued focus on developing stronger business leaders, we anticipate continued growth in the sector."
>
> – Tracey Maconachie, President of the Bioscience Association of Manitoba

About Bioscience Association of Manitoba

The Bioscience Association of Manitoba (BAM) is the voice and organizational nucleus of Manitoba's bioscience industry. Since 1990, it's come to represent over 110 local organizations that span Manitoba's health, bioproduct, food and agriculture sectors and now clean tech.

As a non-profit, BAM strives to grow Manitoba's vibrant bioscience industry. The Association collaborates with members, stakeholders, government officials, and other organizations to achieve excellence in this competitive industry. Through its training and development programs, BAM drives Manitoba's bioscience community forward, providing members with valuable resources, information, and opportunities to grow.

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BIOTECHNOLOGY SNAPSHOT

Ontario

Vital elements

5,645 COMPANIES[50]

82,737 INDIVIDUALS EMPLOYED

63% COMPANIES WITH < 10 EMPLOYEES

4% COMPANIES WITH > 100 EMPLOYEES[51]

COMPANIES PER SUBSECTOR

- 596 Drugs and Pharmaceuticals: 27,465 jobs
- 2,340 Research, Testing and Medical Laboratories: 22,605 jobs
- 2,236 Medical Devices and Equipment: 24,626 jobs
- 473 Agricultural Feedstock and Chemicals: 8,041 jobs

44 UNIVERSITIES AND COLLEGES[52]

42,300 GRADUATES IN SCIENCE, ENGINEERING, MATHEMATICS AND RELATED TECHNOLOGIES EACH YEAR[53]

24 ACADEMIC RESEARCH HOSPITALS HAVE INVESTED AS MUCH AS

$1.4B IN R&D AND EMPLOY

18,000 RESEARCHERS AND RESEARCH STAFF[54]

APPROX. $40.5 BILLION IN ANNUAL REVENUE[55]

$38.5 BILLION IN DIRECT PROVINCIAL GDP[56]

[50] *Life Sciences Ontario Sector Report 2015*
[51] *Ibid.*
[52] *www.investinontario.com/life-sciences#talent*
[53] *Ibid.*
[54] *Statistics Canada, Postsecondary Student Information System- Custom Tabulations, 2018*
[55] *"Blueprint for a Coordinated Life Sciences Strategy", Life Sciences Ontario, 2017.*
[56] *Ibid.*

Industry information provided by Life Sciences Ontario

Overview

Life Sciences encompasses all science related to living organisms, be it human, animal or plant. Ontario has a diverse group of life sciences stakeholders that includes companies operating in a variety of sectors, including biotech, pharmaceuticals and innovative medicines, agriculture, agri-food, the bio-economy, animal health, medical devices, environmental technologies, and many more. Our membership reflects the diversity of individuals involved in the life sciences sector, including individuals, students, investors, members of academia, service providers and emerging and established companies that together make up Ontario's life sciences community.

Sectors and Subsectors

Bio-health

- Medical devices
- Nutraceuticals
- Bio-molecules
- Biopharmaceuticals
- Natural-compound bioactives

Bio-energy

- Biodiesel
- Methane
- Ethanol
- Bio-oil

Bio-industrial

- Biocatalyst
- Bioplastics
- Bioadhesives
- Biosolvents
- Biocoatings

Agri-biotech

- Agri-fibre composites
- Plant genetics
- Animal nutritional supplements
- Animal genetics
- Livestock vaccines
- Functional foods

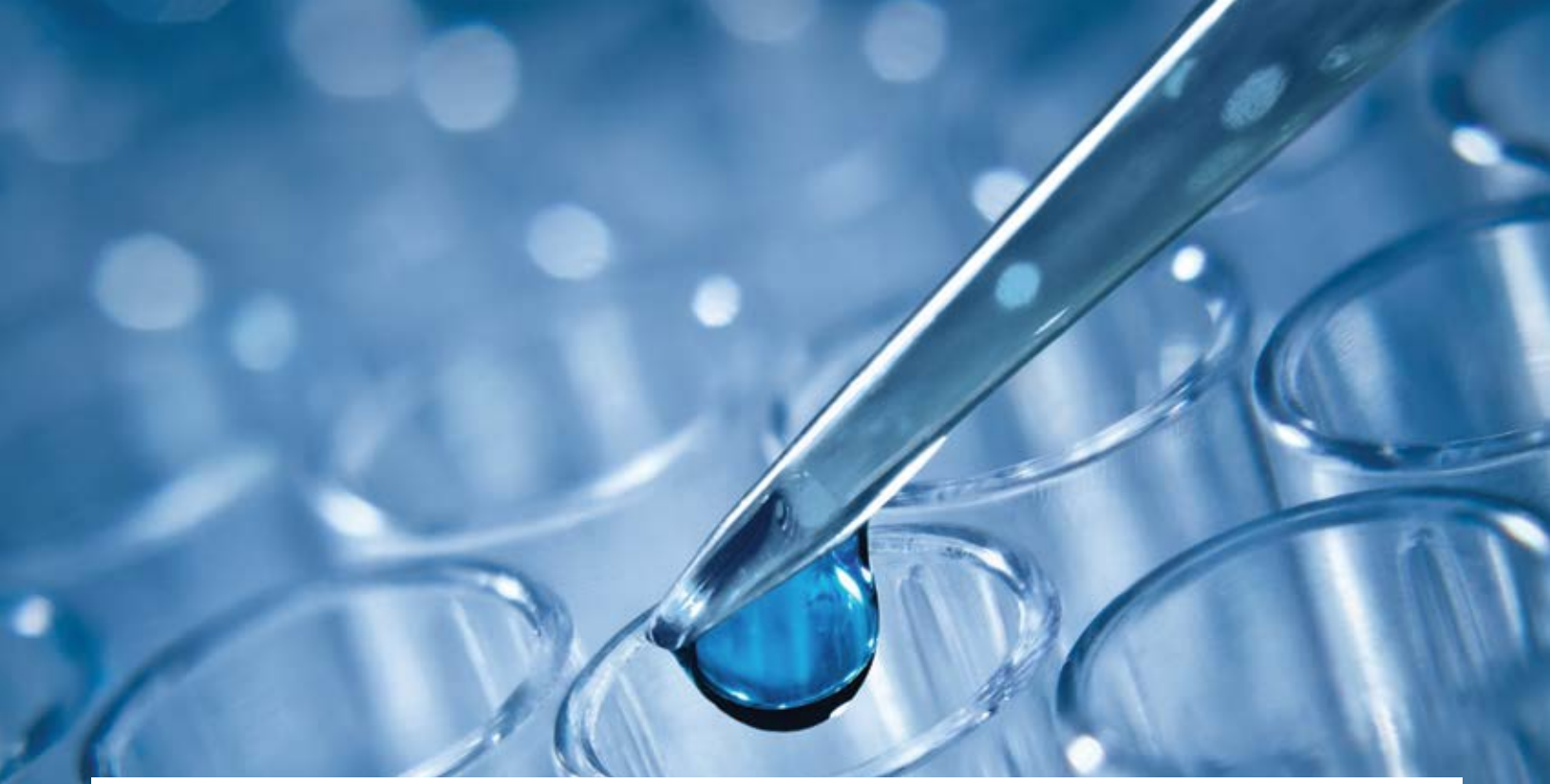
Why Ontario

- Educated workforce: highest educational attainment in the OECD. Ontario has one of the best-educated talent pools in the world, where 68% of adults have completed post-secondary education, more than in any other OECD country.[57]
- Diverse and multicultural: Nearly half of the 250,000 people who immigrate to Canada each year choose to live in Ontario and over 200 languages are spoken in Ontario.[58]
- Low business costs - Ontario has the lowest overall business costs in the G7.[59]
- Environment of innovation: generous incentives for R&D.
  - Almost half of Canada's full-time R&D personnel are in Ontario, where more than $14 billion is spent annually on R&D and five of the top ten corporate R&D spenders in Canada have made Ontario their headquarters' location.[60]
  - Generous R&D tax incentives - Combined with federal R&D programs, Ontario's R&D tax incentive program can reduce after-tax cost of every $100 in R&D spending to between $37 and $61.[61]

Current initiatives and highlights

- Life Sciences Ontario's Blueprint for a Coordinated Ontario Life Sciences Strategy released in December 2017 outlines opportunities for the sector.
- Wages in the life sciences sector are 26.5 percent higher than the provincial average.[62]
- Between 2001 and 2013, the sector's job growth outpaced the provincial average by nearly 10 percent and demonstrated resilience during the 2008 economic downturn.[63]

[57] *www.investinontario.com/why-ontario, 2018*
[58] *Ibid.*
[59] *Ibid.*
[60] *Ibid.*
[61] *Ibid.*
[62] *Life Sciences Ontario Sector Report 2015*
[63] *Ibid.*



Innovation and growth

Export markets represent a huge opportunity for life sciences. The recent Barton Report indicated that export markets in agriculture and food will be our lead opportunity for contribution to the GDP.[64]

More than 55 per cent of Ontarians have a college or university degree[65] – 25 per cent greater than the OECD average. Life sciences can help create more knowledge-based jobs for our highly-educated workforce, along with positions in advanced manufacturing and industry.

Innovation in our health care system will be essential to long-term economic sustainability and better health for Ontarians, enabled by scientific advances, data, and digitized health experiences.[66]

The life sciences sector is also key to developing technologies to reduce greenhouse gas emissions and help control climate change.[67]

LSO Award recipients represent an outstanding group of Ontario life sciences innovators who have made an enormous impact on the Ontario Life Sciences sector. The following companies were awarded Life Sciences Company of the Year.

Fusion Pharmaceuticals Inc.

2018

Fusion is a clinical stage company focused on developing novel **targeted alpha therapeutics (TAT)** for the treatment of chemotherapy resistant cancers.[68]

synaptive

2017

Synaptive Medical Inc. is disrupting the status quo to give surgeons, hospitals, researchers – and especially patients – a connected experience.[69]

PROFOUND MEDICAL

2016

The **Profound Medical** team is committed to creating the powerful combination of real-time MR-guidance as the imaging platform, and ultrasound as the energy source for delivering non-invasive ablative tools to clinicians.[70]

[64] Advisory Council on Economic Growth: Unleashing the Growth Potential of Key Sectors, 2016
[65] Reference: Statscan, 81-59-x: Population aged 25 to 64 with college or university education and their employment rate, Canada, provinces and territories, and selected OECD countries, 2009
[66] "Blueprint for a Coordinated Ontario Life Sciences Strategy", Life Sciences Ontario, 2017
[67] Ibid.
[68] http://fusionpharma.com/, 2018
[69] https://www.synaptivemedical.com/company/, 2018
[70] http://www.profoundmedical.com/about-us/, 2018

Looking ahead

> We have the talent, innovation, and institutions to build and sustain a vibrant provincial life sciences sector."
>
> – Jason Field, President and CEO, Life Sciences Ontario

About Life Sciences Ontario

Life Sciences Ontario (LSO) is a member-driven organization that represents and promotes the province's vibrant and diverse life sciences sector. LSO collaborates with governments, academia, industry and other life science organizations in Ontario and across Canada to promote and encourage commercial success throughout this diverse sector.

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BIOTECHNOLOGY SNAPSHOT

Québec

Vital elements

416 COMPANIES[71]

150 RESEARCH CENTRES[72]

40,000 INDIVIDUALS EMPLOYED[73]

86 CONTRACTUAL RESEARCH ORGANIZATIONS[74]

BIOTECH INDUSTRY[75]

- 74% < 10 permanent employees
- 89% < 25 permanent employees
- 11% > 25 permanent employees

Level of Education

- 10% DES/DEP
- 1% ACS
- 24% DCS
- 18% Bachelor's degree
- 18% Master's degree
- 29% Doctorate

Contract Research Organizations[76]

- 65% < permanent employees
- 80% < 50 permanent employees
- 19% > 50 permanent employees

Level of Education

- 9% high school
- 46% college
- 45% university

COMPANIES PER SUBSECTOR

- 153 Medical Technologies[77]
- 100 Biopharmaceutics
- 117 Natural health products (nutraceuticals)

11 UNIVERSITIES[78]

23 CEGEPS AND COLLEGES[79]

8 INCUBATORS[80]

$5.6 BILLION REVENUE GENERATED BY THE SECTOR[81]

[71] *Ministère de l'Économie, de la Science et de l'Innovation, 2017*
[72] *Montréal InVivo, 2014 as cited by Montréal International, 2016*
[73] *Montréal InVivo, February 2017*
[74] *Ministère de l'Économie, de la Science et de l'Innovation, 2017*
[75] *"Biotechs in Québec, Several profiles, a single objective : improving quality of life, one innovation at a time" BIOQuébec and Pharmabio Développement, 2016*
[76] *"CONTRACTUAL RESEARCH ORGANIZATIONS IN Québec, A powerhouse of socio-economic development for the province BIOQuébec", 2016*
[77] *Ministère de l'Économie, de la Science et de l'Innovation, 2017*
[78] *Ministère de l'Éducation, du Loisir et du Sport du Québec, Year 2013–2014, cited by Montréal International, 2016*
[79] *Pharmabio Développement, 2016*
[80] *Ministère de l'Économie, de la Science et de l'Innovation, 2018*
[81] *Montréal InVivo, February 2017*

Industry information provided by BIOQuébec

Overview

From basic research to commercialization, all the links in the innovation chain in life sciences and health technologies are found in Québec, which boasts world-class innovation infrastructures and renowned specialists. Québec is particularly recognized in the following areas of excellence: oncology, cardiovascular and metabolic diseases, neurosciences and mental health, infectious diseases, aging, cell therapy and regenerative medicine, genomics and precision medicine, health technologies applicable to health, big data and artificial intelligence

Québec also stands out in terms of biotechnology in animal health, marine and forest in addition to having a strong agribusiness pole, thus making it a province offering diversified and comprehensive expertise.

Sectors and Subsectors

Bio-health
- Medical devices
- Biopharmaceuticals
- Natural-compound bioactives
- Bio-molecule

Agri-biotech
- Agri-fibre composites
- Animal genetics
- Plant genetics
- Livestock vaccines
- Animal nutritional supplements
- Functional foods

Why Québec

- Presence of all links in the innovation chain
- Concentration of operations within strong and well-developed geographic locations near the United States
- Highly Qualified Personnel
- 1st in Canada for innovation (patents, public research funds and total R & D expenditures as a percentage of GDP)
- 1st in North America for its low operating costs among the cities in its category
- 10,000 graduates annually in health industry-related programs
- 54% of the population is bilingual (English and French), compared with less than 8% in large urban centres
- 3 mega-university hospitals with state-of-the-art infrastructures and research centres[82]
- $3.5 million value added by biotech

Current initiatives and highlights

Three major initiatives stem from the Québec government's 2017–2027 Québec Life Sciences Strategy:

STARTUP—AmorChem II, whose initial capitalization is $44 million, focuses on investing in promising life sciences projects from Québec universities and research centres. Its innovative business model involves investing in and supporting academic projects to transform them into attractive biotech companies that can be interesting for financial or pharmaceutical partners.

GROWTH—The goal of the BioMed Propulsion program is to financially support Québec companies with strong growth potential in the life sciences sector, in order to get them to commercialize the results of their research. An investment of $100 million from the Government of Québec.

CLINICAL RESEARCH—Québec's expertise and resources are joining forces with CATALIS Clinical Research Québec to promote excellence in clinical research in the province and to facilitate cooperation between the various life sciences players in order to accelerate the development of innovative treatments. Five areas are being focused on: medical leadership, operational excellence, networking and coordination, patient engagement and the promotion of innovation.

[82] *Montréal International, 2016*

Innovation and growth

Personalized medicine, which refers to a system focused on the prediction, prevention and precision of care adapted to the needs of individuals, requires a large body of data, particularly from genomics, a field of expertise in which Québec researchers and companies are particularly active.

The integration of personalized medicine into the healthcare system will be facilitated through concrete applications based on artificial intelligence (AI), a strategic area for Québec that will democratize access to precision medicine through detection processes, diagnoses and treatments using the data collected to date.

Growth companies

Prometic

A Québec-based international company, **ProMetic (PLI)** has just received an orphan drug designation from the US Food and Drug Administration (FDA), which opens a brand new and important market for its Ryplazim™ plaminogen.

Prevtec microbia

This company, an offshoot of the Faculty of Veterinary Medicine of the Université de Montréal, has developed certification expertise facilitating the international marketing of its vaccine against diarrhoea in swine, Coliprotec®.

Endoceutics™

This multinational is building a plant near Québec City that will allow it to produce its Intrarosa drug, discovered and developed in Québec and recently approved by the FDA. This project will create almost one 1,000 jobs.

Looking ahead

> There will be many technical and undergraduate jobs created to support the growth of our industry. To publicize these career opportunities will be a determining factor of success."
>
> – Anie Perrault, General Manager, BIOQuébec

About BIOQuébec

BIOQuébec is committed to supporting Québec's biotechnology and life sciences industry to position Québec, on an international scale, as an undeniable key player in the biotechnology and life sciences field.

List of services

BIOQuébec supports members on three levels: management and operations, networking and business development, as well as for the business context and government policies that result from the following services:

- Discounts and privileges through agreements with our partners;
- Membership Directory, Networking Events, Personalized Contact-Making;
- Information, sectoral watch and representations to socio-economic leaders.

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BIOTECHNOLOGY SNAPSHOT

New Brunswick

Vital elements

45 COMPANIES

250 INDIVIDUALS EMPLOYED

2 COMPANIES WITH > 50 FTEs

43 COMPANIES WITH < 50 FTEs

COMPANIES PER SUBSECTOR

- 16 bio-health
- 13 agri-biotech
- 7 bio-energy
- 9 bio-industrial

7 POST-SECONDARY INSTITUTIONS

14 RESEARCH ORGANIZATIONS

8 INCUBATORS AND ACCELERATORS

1 PUBLIC PRIVATE PARTNERSHIPS

$120 MILLION REVENUE GENERATED BY THE SECTOR

WORKFORCE DEMOGRAPHICS

- Significant amount of internationally educated professionals
- Increasing number of data analytics/ data engineering roles within our companies

Industry information provided by BioNB.

Overview

New Brunswick's bioscience sector has emerged from its long-standing history of innovation in traditional industries, with significant research and development capacity in agriculture, agri-tech, forestry, aquaculture, and marine science. Leveraging its significant natural resources, New Brunswick has developed expertise in marine and aquaculture technologies, biorefining, bioprocessing and bioproducts. New Brunswick's bioscience sector is the broadest of all four Atlantic provinces with established companies in life sciences, medical technology, animal health, bioenergy, bioproducts, and ocean technology.

Sectors and Subsectors

Bio-health
- Medical devices
- Biopharmaceuticals
- Nutraceuticals
- Natural-compound bioactives

Bio-energy
- Ethanol
- Wood pellets
- Methane to electricity

Bio-industrial
- Bioadhesives
- Bioplastics

Agri-biotech
- Animal genetics
- Plant genetics
- Animal health
- Functional foods
- Animal nutritional supplements

Why New Brunswick

- Significant underutilized and accessible agricultural land
- Most diversified natural resource assets in Canada
- Robust research community of 14 research institutions that spans numerous disciplines
- Home to some of the world's largest forestry, aquaculture and agri-food companies
- Lowest cost of doing business in Canada
- Significant sector growth: the number of biotech companies in NB has doubled since 2013
- Bilingual workforce in English and French

Current initiatives and highlights

The Government of New Brunswick has stated its commitment to building a best-in-class hub of infrastructure and research for cannabis production and the commercialization of related technologies, from bio-industrial opportunities in hemp, to biopharmaceuticals.

The New Brunswick Centre for Precision Medicine at l'Université de Moncton will house more than 100 researchers focused on solutions for chronic diseases and cancer.

New Brunswick has much to contribute to Canada's commitments to cleantech with projects in agriculture, bio-energy and smart-grid technologies.

The Government of Canada's Atlantic Growth Strategy includes strategic initiatives to attract and retain a skilled workforce, foster business innovation and advance clean technologies.

Innovation and growth

Resson Aerospace, an agri-tech company that has developed drone systems and image processing for crop monitoring, recently received $14 million in investment from Monsanto and a U.S. venture capital firm.

Mycodev Group is producing and selling medical grade chitosan from fermented fungus to major biochemical companies around the globe.

SomaDetect, a company developing hardware and software that monitors dairy herd health, won $1 million in investment at the 43North competition held in Buffalo, New York. SomaDetect was also named one of Canada's Top 20 most innovative new Canadian tech companies by CIX.

The University of New Brunswick and St. Thomas University have each appointed research chairs in cannabis and health and social policy related to cannabis.

Growth companies

LUMINULTRA microbial monitoring

LuminUltra Technologies is one of the fastest growing companies in Atlantic Canada and is recruiting talent into their product development, management and sales teams.

Sylvar
A member of the Andermatt group

Sylvar Technologies manufactures environmentally safe pest management products for agriculture and forestry. Sylvar is the market leader in North America and is currently expanding into the European and South American markets.

ADI SYSTEMS

ADI Systems, a wastewater treatment and waste-to-energy company, was acquired by Pittsburgh-based Evoqua Water Technologies, the world's largest provider of wastewater solutions.

Looking ahead

> New Brunswick's bio-economy is growing and attracting world-class businesses to the area. The demand for highly skilled workers is growing."
>
> – Meaghan Seagrave, M.Sc., Executive Director

About BioNB

BioNB is the trusted bioscience authority in New Brunswick, Canada. We promote a supportive business environment for bioscience ventures through coaching, community building and advocacy.

List of services

- Business support services
- Sector intelligence
- Special events

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BIOTECHNOLOGY SNAPSHOT

Prince Edward Island

Vital elements

54 COMPANIES

1,600 INDIVIDUALS EMPLOYED

49 COMPANIES WITH < 50 FTEs

5 COMPANIES WITH > 50 FTEs

COMPANIES PER SUBSECTOR

- 22 Human Health
- 7 Animal Health
- 6 Fish Health
- 12 Contract Services(CRO/ CMO)
- 5 Diagnostics
- 2 Medical Device

3 POST-SECONDARY INSTITUTIONS

7 RESEARCH ORGANIZATIONS

2 INCUBATORS

$215 MILLION REVENUE GENERATED BY THE SECTOR

BREAKDOWN OF CAREER OPPORTUNITIES:

- 28% scientific/research
- 11% quality assurance/control
- 35% production/engineering
- 26% business admin/senior management

The PEI Bioscience Cluster has a diverse workforce of Canadian and internationally-educated professionals.

OVER $70M R & D EXPENDITURES

$33 MILLION IN FOLLOW-ON INVESTMENTS

Industry information provided by Prince Edward Island BioAlliance

Overview

The Prince Edward Island Bioscience Cluster is the location of choice for companies engaged in the research, development, and commercialization of bioactive-based human, animal, and fish health and nutrition products. **Since 2005, the PEI Bioscience Cluster has more than tripled in size**, with remarkable growth in business revenues and employment, and a marked increase in private and public-sector investments in our companies. The Cluster includes over 50 bioscience companies, seven research institutions, and is home to ***Natural Products Canada***, North America's first business accelerator dedicated to the commercialization of products and technologies based on natural product chemistry. Market segments include functional food ingredients, cosmetic ingredients, natural health products, supplements, animal health and nutrition products, fish health, green replacements for industrial chemicals, and CRO (Contract Research Organization) and CMO (Contract Manufacturing Organization) services.

Sectors and Subsectors

Bio-health
- Biopharmaceuticals
- Nutraceuticals
- Natural-compound bioactives
- Diagnostics

Agri-biotech
- Animal health
- Fish and livestock vaccines
- Animal nutritional supplements
- Functional foods

Why Prince Edward Island

- The PEI Bioscience Cluster is home to Emergence - Canada's Bioscience Business Incubator
- Relevant, accessible, award-winning science and technology
- Collaborative business and research environment
- Customized financial assistance
- Ready access to key decision makers
- Faster to market processes

Current initiatives and highlights

PEI BioAlliance is home to Emergence Bioscience Business Incubator, a national program supporting start-up and scale-up companies. The virtual incubator serves high-potential companies from across Canada and provides a "soft landing" for innovative international ventures seeking to start-up, establish themselves or expand into, North America.

PEI is home to Natural Products Canada Inc., a $14 million national Centre of Excellence for the commercialization and research of natural products, to accelerate the commercialization of new products and technologies derived from natural products.

In 2017, the BioAlliance unveiled a new $1-million suite of fermentation and downstream processing equipment for industry clients.

UK-based Croda International recently acquired PEI marine biotechnology company, Nautilus Biosciences Canada Inc., establishing the Croda Centre of Innovation for Marine Biotechnology at Nautilus' existing base at the University of Prince Edward Island.

BioVectra and Sekisui each had major expansions in 2017 and Somru BioScience built a new manufacturing facility.

Atlantic Canada's Ocean Supercluster is one of five new clusters announced by the Federal Government in February 2018. The BioAlliance is a member of the Ocean's Supercluster team, representing marine biotechnology and fish health and nutrition capabilities in the region.

Innovation and growth

Through a unique and successful collaborative cluster model, we have established the enabling conditions for business success. Since 2005, the number of bioscience companies has more than tripled with significant growth in business revenue, employment, and investments. Cluster growth targets for 2020 include:

- Doubling of private sector revenues to $400 million per year
- Bio sector employment exceeding 2000
- Increased R & D expenditures to $100 million per year
- Increased private sector capital investment
- Increased follow-on capital
- Increased recognition as a leading international centre for bioactives-based health product development

Growth companies

Named one of the top employers in Atlantic Canada, **BioVectra** is a contract development and manufacturer that serves pharmaceutical and biotech companies. The first established biotech company in Prince Edward Island, they are now the largest with over 300 employees. They have four cGMP facilities and have recently added a new 21,000 sq. ft., $4-million warehouse that will enhance their ability to grow with the global demand for its products and services.

Named one of the top 100 employers in Canada, **Sekisui** provides in-vitro diagnostic kits and supporting chemicals for hospitals and clinics worldwide. The company recently completed a $6-million expansion and renovation to their Charlottetown facilities and are one of only a few manufacturers in Atlantic Canada certified in ISO Environmental Management. Sekisui was also recognized in 2018 as one of the top companies in the country for hiring recent graduates.

Somru BioScience is dedicated to developing antibody and immune assay solutions for research, diagnostic and therapeutic applications, bringing its clients affordable life-saving bio-therapeutics to market sooner. The company recently moved into a new 5,000 sq. foot facility in Prince Edward Island and signed a joint venture agreement worth $150 million with Bangladeshi pharmaceutical powerhouse, Radiant Pharmaceuticals.

Looking ahead

> Our Cluster continues to exceed expectations in revenue growth, job creation, and investment. We are providing regional leadership as an important centre in Canada's bioscience innovation ecosystem."
>
> – Rory Francis, Executive Director, PEI BioAliance

About PEI BioAlliance

The Prince Edward Island BioAlliance is the private sector-led partnership of businesses, research and academic institutions, and government agencies dedicated to building the province's bioscience sector. Through a unique and successful cluster model, we have established the enabling conditions for business success. Companies have ready access to decision-makers and get to market faster. The BioAlliance is home to ***Emergence***, Canada's bioscience business incubator. This virtual incubator is entirely dedicated to building successful bioscience-based businesses, and currently, has over 70 bioscience-based members from Canada, US, Europe and Australia. The incubator provides services that include mentorship, product development, IP strategy, market assessment, regulatory strategy, and capital formation. The BioAlliance also serves the Cluster through business development and HR initiatives, providing communications and marketing services, and hosting international conferences.

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BIOTECHNOLOGY SNAPSHOT

Nova Scotia

Vital elements

100+ COMPANIES

1,500+ FULL TIME EMPLOYEES

APPROX. 90 COMPANIES WITH < 50 FTEs

APPROX. 10 COMPANIES WITH > 50 FTEs

COMPANIES PER SUBSECTOR

- 84 Bio-health
- 1 Bio-energy
- 1 Bio-industrial
- 10 Agri-biotech

11 POST-SECONDARY INSTITUTIONS

26 RESEARCH ORGANIZATIONS

16 INCUBATORS/ ACCELERATORS

$300 MILLION REVENUE GENERATED BY THE SECTOR

Industry information provided by BioNova.

Overview

In Nova Scotia the life sciences sector has been identified as one of the largest opportunity areas for economic growth and represents some of the most highly educated and innovative people in the country. Our scientists are doing world-class R&D and have access to state-of-the-art incubator facilities, including a $75 million life sciences incubator and research center. In the life sciences industry we continue to punch well above our weight class as we have generated over $300 million in annual sales, resulting in over $1 billion in financial exits over the past six years. The sector shows no signs of stopping with continued federal and provincial investments into world-leading research and innovation in the region.

Sectors and Subsectors

Bio-health
- Medical devices
- Biopharmaceuticals
- Nutraceuticals
- Natural-compound bioactives
- Bio-molecules

Bio-energy

Bio-industrial

Agri-biotech
- Livestock vaccines
- Animal nutritional supplements
- Functional foods

Why Nova Scotia

- Nova Scotia is home to over 100 companies, 26 research organizations, ample infrastructure, supporting organizations and a funding environment that makes us a business destination of choice.
- Our size makes us nimble, allowing companies to get to market more quickly and for less money and we have one of the most highly educated workforces in the country.
- Future talent is in abundance from our 11 post secondary institutions. Coupled with the maritime lifestyle, we are an obvious choice.

Current initiatives and highlights

BioNova has completed a sector growth strategy for the Province of Nova Scotia and will begin the implementation phase in the coming months to further expand the impact of our sector. The economic potential within the life sciences in Nova Scotia is considerable based on our ability to support future improvements from healthcare to supplying alternative manufacturing ingredients. With infrastructure and support programs uncommon in many jurisdictions, we are poised to see unprecedented growth over the coming years. As an industry-led initiative, BioNova has applied its knowledge and reach to develop a comprehensive plan that will lead the sector to higher levels of company formation and growth, higher employment levels and increased company revenues and salaries that will continue to eclipse the provincial average.

Innovation and growth

Nova Scotia continues to support a number of key life sciences areas of strength: Medical Technologies, Pharmaceuticals & Vaccines, Natural Health Products, Digital Health and BioProducts. Our expertise in the marine environment, the growing emphasis on preventative and participatory health, aging and chronic disease management, population health and environmental sustainability are all key areas of research within the province. Driven from research abilities, Nova Scotia is well positioned to produce and attract more innovative companies that will commercialize top quality research while generating a highly positive economic impact.

Growth companies

APPILI THERAPEUTICS

Appili Therapeutics was founded to advance the global fight against infectious disease by matching clearly defined patient needs with drug development programs that provide solutions to existing challenges within healthcare.

DENSITAS Driven by Data

Inflating healthcare costs and strict mammography quality standards mean mammography departments globally face immediate pressures to curb resource waste and standardize breast density reporting protocol while optimizing clinical outcomes. **Densitas** alleviates these pressures with its comprehensive breast imaging analytics platform.

3D BOLUS

Improving the accuracy and efficiency of radiation therapy. **3D Bolus** is a software application that provides practitioners with turn-key software that enables printing of patient-specific bolus for a variety of applications.

Looking ahead

> It is estimated that by 2030 the number of jobs in the life sciences sector in Nova Scotia will grow by 200%."
>
> – Scott Moffitt – Managing Director, BioNova

About BioNova

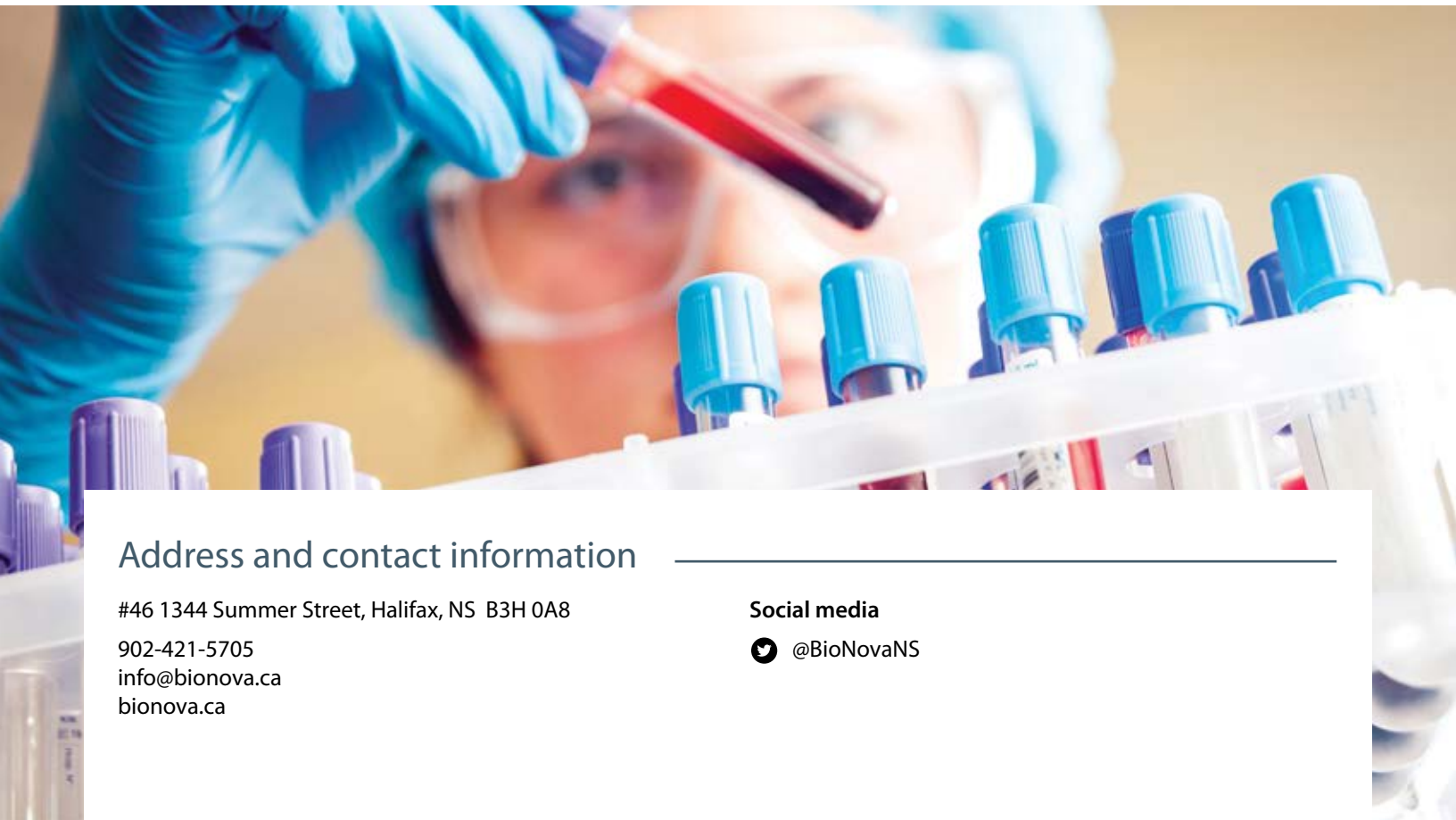
BioNova is the industry association leading the advancement of the life sciences sector in Nova Scotia. BioNova leads and supports its members as we build a successful, self-sustaining life sciences industry.

BioNova catalyzes value creation as a responsive knowledge hub for start-ups, scale-ups and strategic partners in the life sciences. Our programs evolve based on the needs of the sector and are categorized in three areas:

ACCELERATION: Programs, services and partnerships that support companies and their accelerated growth.

ADVISORY: Providing information and connections, education and training programs and networking opportunities.

ADVOCACY: Building a supportive ecosystem, demonstrating sector value, attracting capital and talent while sharing our successes.



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Conclusions

The overall picture of the bio-economy's labour market is one of growth, opportunity and potential. Throughout the country, national and regional initiatives - especially the new superclusters - to foster and grow the industry highlight ongoing effort and investment that is critical to its success.

High engagement in BioTalent Canada programs from industry, academia and the labour pool in Ontario and B.C. may reflect a higher concentration of activity and availability of talent and opportunities, yet it does not necessarily mean there is a corresponding lack of opportunity in other parts of the country. Indeed, some of the greatest growth potential in biotechnology may be found in the prairie and Western provinces, and in the Atlantic provinces. Similarly, Québec shows potential for further engagement.

One noteworthy area to watch for growth may be agri-biotech, specifically in the cannabis industry. With legalization of cannabis products set for July 1, 2018, we could see a sharp rise in demand for people with the agricultural knowledge needed to grow this previously illicit crop. Meeting that demand will require training and resources. Indeed, some of the reporting in this document suggests that this need already exists, and efforts to fulfill it are underway today.

Feedback from employers and participants in BioTalent Canada's programs consistently reveal an ongoing need for training opportunities and support, especially for people seeking their first jobs in the industry or making a transition into it. The volume of feedback that suggests the country's efforts in biotechnology will be slowed or diminished without ongoing and increasing support for employment opportunities, particularly in foundational early-career roles and new initiatives, cannot be ignored.

Finally, while the positive outlook for Canada's biotechnology sector is encouraging, the information and data available are neither standardized nor complete. They come from multiple sources that use different categorizations, terms and definitions across a range of time periods. This introduces a degree of variability in developing a full, clear and current picture of activity and outcomes nationally and regionally. This report and others like it aim to help fill that gap and would further benefit from more aligned and granular data across the industry.

BioTalent Canada remains eager, willing, and able to help advance the country's biotechnology industry toward the bright future that hard-working professionals throughout the bio-economy are working to strengthen.

GATHERING THE DATA

Provincial and national snapshots were provided by the provincial and national associations that represent those sectors and regions.

Student Work Integrated Learning Program data was collected from application forms. Feedback and comments on BioTalent Canada wage subsidy programs were collected from employer and participant surveys after placements were completed.

All other data sources are referenced.

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For more information, please contact
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bioBenefits
BENEFITS FOR LIFE

THANK YOU

BioTalent Canada wishes to thank all the companies and participants who have participated in BioTalent Canada's wage subsidy programs and those partners who have supported and promoted the programs. Through their support in hiring new graduates, students, underrepresented groups and internationally educated professionals these companies have helped to enhance the biotech talent potential and strengthen Canada's bio-economy.

BioTalent Canada Partnership Plus Network

Thank you to BioTalent Canada's partners who support all of BioTalent Canada projects, programs and activities.

Platinum

Innovative Medicines Canada

Gold Plus

BioBenefits

Gold

Immigrant Employment Council of BC (IEC-BC)

Ag-West Bio

Silver

Business Wire

Gowling WLG

HealthPartners

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The Truth Matters.

Depending on the design, Canada's Clean Fuel Standard has the potential to create over 12,500 jobs and generate $22.6 billion per year in economic activity, through increased biofuels use and production. It's time to make smart policy that matters.

Renewable Industries Canada