

## Contact

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richardboudreault (LinkedIn)

## Top Skills

Start-ups

Strategy

Business Strategy

## Languages

English (Native or Bilingual)

German (Elementary)

French (Native or Bilingual)

## Certifications

Introduction to the Arctic: Climate

Quantum Algorithms for  
Cybersecurity, Chemistry, and  
Optimization

Nitrox, augmented oxygen mixtures  
diving

Quantum Computing realities

Practical Realities of Quantum  
Computation and Quantum  
Communication

## Honors-Awards

Honorary Fellow Royal Canadian  
Geographic Society

Beacon in Photonics Research and  
Leadership

Energy Globe Award Canada

2016 CAP-INO Medal for  
Outstanding Achievement in Applied  
Photonics

The Aluminium Rising Star 2013

## Publications

Published more than 78 learned and  
refereed articles, including 2 book  
chapters and 16 official reports.

# Richard Boudreault P.Phys., MEng, MBA

FRSC, HFRCGS, FCMOS, FInstP, FCASI, FWAAS, FCAE, FIAA,  
AFAIAA, SMIEEE, Adj. Prof. (É. Polytechnique and U. of Waterloo),  
Visiting Scholar (McGill)

Montreal

## Summary

As a charismatic and results-driven Chief Executive Officer with 20+ years of experience in executive and chairman roles, I pride myself on steering finances and operations, achieving significant business growth and profits alongside innovative solutions in engineering and technology aimed at solving real-world problems. Blending foresight, analytical thinking, and a dedication to improvement, I have implemented long-standing solutions by leveraging knowledge in materials/nanotechnology, energy, natural resources, mining, metallurgy, clean tech, medical devices, neural net/AI/Big Data, and Aerospace industries. A natural leader, I excel at managing teams, evaluating performance and ensuring a skilled workforce. A self-starter and creative strategist, I offer core executive leadership skills and the ability to make sound financial decisions. Over my progressive career, I have obtained 13 patents with 68 pending and have served on 30 boards of directors.

Connect with me today to discover how I can accelerate the achievement of your short and long-term goals.

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## Experience

Dymedso

Chief Executive Officer and Executive Chairman

January 2020 - Present (9 months)

Lachine

Dymedso is a 10-year old innovative Canadian medical device venture. It has developed and patented a low frequency acoustic vibration based system used in dislodging mucus in the lungs of bronchitis and pneumonia patients or those due to COVID-19 and other decadal SARS infections. It is medically approved in Canada (Health Canada), the US (FDA) and the EU (CE). The

## Patents

Multiwavelength imaging of highly turbid media

Simultaneous multiwavelength TPSF-based optical imaging

Processes for extracting aluminium from aluminous ores

system permits safe, swift and painless dislodging of lung mucus in a wide range of patients from neonatal to elders. It can replace ventilators or be used in synergy with these improving lung airway clearing. It is portable and does not require the attendance of a rarefying health professional to operate. Some chronic patients, such as those with Cystic Fibrosis, use it at home with little supervision. More than 650 devices have been fielded globally. Dymedso is ISO 13485, approved for medical device design, manufacturing and maintenance.

The researchers in China, published in The Lancet, found 53 of the 54 patients who died from COVID-19 had developed deep pulmonary issues including 50 with ARDS while only nine of the 137 survivors had ARDS. Acute Respiratory Distress Syndrome (ARDS) is targeted by the Dymedso's Frequencer product line. Germany is the global leader in the use of the Frequencer for COVID-19.

The global airway clearance systems market size, outside of COVID-19 market, was valued at USD 493.63 million in 2018 and is expected to expand at a CAGR of 4.5%, accelerating to 7.6% in the 2020-2026 period, or 4 times faster than population growth. The market is expected to reach a valuation of USD \$ 838.7 Mn by the end of 2025. This non COVID-19 market is driven by rising adoption of airway clearance systems for the treatment of Chronic Obstructive Pulmonary Disease (COPD), Cystic Fibrosis, pneumonia and Chronic Bronchitis.

As per a World Health Organization (WHO) report published in 2019, COPD is the third leading cause of death globally, likely to rise with increasing air pollution.

First Nations University of Canada

Chair of the Audit, Finance and Risk Committee and Governor

March 2019 - Present (1 year 7 months)

Regina

The First Nations University of Canada provides an opportunity for students of all nations to learn in an environment of First Nations cultures and values. The university is a special place of learning where we recognize the spiritual power of knowledge and where knowledge is respected and promoted. In following the paths given to us by the Creator, the First Nations have a unique vision to contribute to higher education. With the diversity and scope of the First Nations degree programs, the university occupies a unique role in Canadian higher

education. The university promotes a high quality of education, research and publication.

At the First Nations University of Canada, First Nations students can learn in the context of their own traditions, languages and values. Rooted in their own traditions, our students will walk proudly and wisely today. The university, through extension programming, reaches out and welcomes First Nations peoples to use its resources for the enrichment of their communities.

The university requires facilities which reflect the uniqueness, values, dignity and beauty of the First Nations it represents. It will include appropriate recognition and integration of the role of the Elders, cultural symbols and the First Nations connectedness to the land.

### Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES)

Expert Reviewer

June 2020 - Present (4 months)

Montréal

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is an independent intergovernmental body established by States to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

### U. of Waterloo

Adjunct Professor

May 2020 - Present (5 months)

Co-supervise graduate students in Earth Systems and Environment Sciences. Perform research on various Earth Systems and on environmental issues. But also on related inverse solutions with applications in remote sensing and medical instrumentation.

### Yava Technologies Inc

Member Board Of Directors and Advisor

January 2018 - Present (2 years 9 months)

Canada

Yava is a sustainable tech corporation with original techniques for the generation of innovative high-quality materials including industrial-grade silica

and high-purity alumina for applications in high-performance energy storage technology.

### UNI3T

Member Of The Board Of Advisors

January 2020 - Present (9 months)

Montreal, Quebec, Canada

Increase the value of your pharma, biotech and hospital research innovation pipeline with the use of special technologies such as artificial intelligence(AI), big data and cloud, we can help leverage your organization innovation potential. We make innovation a concrete, growth generating process, leveraging on tangible technologies. The goal is to improve the overall value of your organization through leveraging deep-learning based AI.

### Future Skills Center

Member Of The Board Of Advisors

December 2019 - Present (10 months)

Toronto

New and emerging technologies have an effect on every aspect of Canadians' lives, including the workplace. Automation, artificial intelligence, robotics and clean tech are some of the many technologies that are changing the skills needed to succeed at work. These changes will also impact the way people develop skills and their ability to adapt and take advantage of new opportunities.

Future Skills is part of the Government's plan to ensure that Canada's skills development policies and programs are prepared to meet Canadians' changing needs. The Government is investing \$225 million over four years, starting in spring 2018, and \$75 million per year thereafter in the Future Skills.

An independent research center that develops, tests and measures new approaches to skills assessment and development. Future Skills includes a focus on addressing the needs of disadvantaged and under-represented groups, such as Indigenous people, persons with disabilities, low-income workers, newcomers to Canada and youth. This will help ensure that all Canadians can benefit from emerging opportunities.

### Polytechnique Montréal

Adjunct Professor

April 2018 - Present (2 years 6 months)

Région de Montréal, Canada

Leveraging expertise in the field of chemical engineering, green chemistry, and clean tech innovation, I delivered lessons and lectures, aiding the success of students. I dissected dense and difficult concepts and held office hours to provide additional help to students when needed. I also conducted chemical engineering research and developed nanotechnologies to generate solutions requiring little energy in collaboration with University of Sherbrooke and a biodiversity research center to develop various tools and perform research related to Arctic and north-south ecological gradients.

Some of my key contributions are as follows:

- Built positive relationships with students and teaching assistants, cultivating a creative learning environment.
- Generated low or no-energy atmospheric water for remote northern locations benefiting northern and First Nations communities.
- Provided low-carbon methane fuel to northern communities by developing permafrost clathrate science and clathrate energy transportation.

### Innovobot

Investment Board and Advisor

October 2019 - Present (1 year)

Montreal, Canada Area

It is a successful operators lead seed to round A VC Fund. We foster innovation across industries for the benefit of society, following the Tech for Good model. Following the UN 17 SDG objectives. It has invested in Carbicrete a CO2 negative concrete product and a few more. It is invested in AI, robotics, RPVs, indoor agriculture lighting, etc...

the address of a McKinsey & Co paper on Tech for Good follows. <https://www.mckinsey.com/featured-insights/future-of-work/tech-for-good-using-technology-to-smooth-disruption-and-improve-well-being>

### INO

Chair of the S&T advisory committee, BoD member (1999-2004)

1999 - Present (21 years)

Quebec, Canada

A great Canadian success, INO is a 200 specialists strong research, technological, design and development firm for optics' and photonics' solutions for SMEs and large corporations. It is Canada's foremost national center of excellence in photonics, home to the largest concentration of skill in the

field and serves clients of all sizes from all parts of Canada and around the world. With a client oriented approach, INO has one of the highest rate of self-funding in Canada. INO offers a complete range of integrated services in the fields of optics/photonics to clients of all descriptions in every field of industrial activity. It also possesses a variety of technologies and innovative processes based on a strong IP portfolio. It has a portfolio of 209 patents and 60% of the clients are SMEs. Over the last 26 years, INO has performed 5000 service contracts for the industry and 54 technology transfers. INO has also generated 29 spin-off corporations employing more than 1000 people. Similar to best applied R&D center in the World, INO is raising 50% of its operating budget directly from industrial contracts and technology transfer. INO is second to none in terms of raising industrial money per employees. Widely recognized by most players as being highly instrumental in the diversification and revival of Quebec City's economy to full employment, creating a high-tech/optics-photonics hub. The R&D advisory reviews the internal research projects, product development and advise on potential applications. [www.ino.ca/en](http://www.ino.ca/en)

## AWN NANOTECH

### CEO

January 2017 - Present (3 years 9 months)

Montreal, Canada Area

AWN nanotech, uses a patent pending solar cell powered carbon-based nanotechnology atmospheric water extraction solution. It enables the low cost, near zero energy and green production of potable water in areas of low water availability and for the heavy water consuming industry. It operates in very low relative humidity conditions. Household 50 l/day and Industrial products 1000-50,000 l/day systems are marketed. Of interest to wineries, micro-breweries, military forces, international humanitarian organization and remote communities of northern Canada and parch locations like the American southwest and California.

Awn Nanotech uses Quantum Chemistry to develop the atmospheric water extraction of it's nanosponge within an alliance with 1QBit. QC modelling being performed on cloud based semiconductor and gate quantum computing facilities. The \$2 Million investment in Awn research project's accumulate to 2 M\$ and is funded by the provincial and federal government.

A market Watch global study produced in 2019 advises that the worldwide market for Atmospheric Water Generator (AWG) is expected to grow at a

CAGR of roughly 25.6% over the next five years, will reach 310 million US\$ in 2024, from 100 million US\$ in 2019.

### Onitsway Delivery

Chairman Of The Board

December 2018 - Present (1 year 10 months)

Montreal, Canada Area

OnItsWay is reinventing a green delivery last mile. It helps merchants differentiate their ecommerce efforts by offering hyper fast and convenient same day delivery, while keeping sustainable development a core goal and helping “clean” the last mile. Consumers who opt for local merchants can get their purchases in as little as one hour, track progress in real-time on a map, take special arrangements with the driver, and initiate returns to store in only a few clicks, all via the mobile application. Drivers can join the network on their own schedule, get great incentives if they drive electric, and OnItsWay optimises the network with its own fleet of electric vehicles. At the core is an AI-based dispatch algorithm that optimises for direct store-to-consumer deliveries, pooling of parcel shipment, optimises the electric fleet usage, and ensures competitive parcel shipment costs and great rewards to drivers.

### Central America Nickel

Director Board Of Directors

January 2020 - Present (9 months)

Montreal

CENTRAL AMERICA NICKEL INC. (“CAN”) IS A CANADIAN CORPORATION FOCUSED ON THE PROCESSING AND PURIFICATION OF ENERGY METALS (Li, Ni, Co, Cu, Mn, V, Sc, Nb, Ta) USING PATENT REGISTERED UAEx TECHNOLOGY WITH STRATEGIC PARTNERS.

THE COMPANY CONTROLS SUBSTANTIAL RESERVES OF ENERGY METALS; 60,000,000 TONNES AT 45% Fe, 2.5% Cr, 0.1% Co, 0.5% Ni and 186 grams of Sc. CAN focuses on building a future of clean energy using patented ultrasound assisted extraction technology, with the development of Canadian plants for processing energy metals, in order to cater to Canadian aluminum, steel and renewable energy firms.

### BIOS2 - incorporate biodiversity scenarios into decision making

Member Board Of Advisors

January 2019 - Present (1 year 9 months)

Sherbrooke, QC

The primary objective of the BIOS2 research program university network is to enhance the capacity of Canadian organizations to evaluate the status of biodiversity and to incorporate biodiversity scenarios into decision making. A global strategy, built on collaborative efforts between scientists, governments, private industries and NGOs, is required to meet this objective. It will benefit both the evaluation of single projects (e.g., our partner Hydro-Québec is a pioneer in Québec for conducting environmental impact assessments of hydropower plants) and entire industrial sectors.

### McGill University

#### Visiting Scholar

January 2019 - Present (1 year 9 months)

Coaching finishing chemical engineering students on a capstone project to transform CO<sub>2</sub> into a useful Formic Acid through electrochemistry as a GHG abatement technology.

### United Nations

#### IPCC Expert Reviewer

2017 - Present (3 years)

#### Earth

Reviewing the UN IPCC Special Report on Climate Change and on Land Use. Sustainable land management, which seeks an integrated land-water-biodiversity nexus perspective, has the potential to contribute to several Sustainable Development Goals (SDGs) including food, biodiversity, water, as well as on climate change.

### Sigma Xi, The Scientific Research Society

Member Board of Directors, Executive Committee and the Awards Committee.

December 2014 - Present (5 years 10 months)

Sigma Xi, The Scientific Research Society is the international honor society of science and engineering. One of the oldest and largest scientific organizations in the world, Sigma Xi has a distinguished history of service to science and society for more than one hundred and twenty five years. Scientists and engineers, whose research spans the disciplines of science and technology, comprise the membership of the Society. Sigma Xi chapters can be found at colleges and universities, government laboratories, and industry research centers around the world.

More than 200 Nobel Prize winners are or have been members. Sigma Xi was established first at Cornell University nearly a century ago.

<https://www.sigmaxi.org/about#sthash.apAcyXFN.dpuf>

## Technologies Aérospatiales Inc.

### Consultant

February 1991 - Present (29 years 8 months)

Montreal, QC

Business, entrepreneurship, strategy, governance, profitable sustainability, product development and innovation specialist. Technology-Market-Financing coupling services including venture and Intellectual Properties (IP) valuation. With a special interest in space technologies and exploration natural resources, clean tech, energy, climate change, environment, aerospace, quantum computing, quantum cryptography and entanglement, quantum and physical optics, biophotonics, power and energy issues. Proven expertise in merger and acquisitions (M&A), strategy, financing of ventures, restructuring-change management and public corporation management. Serves as Advisor and Entrepreneur-in-residence to a privately funded industrial technology incubator.

## Flown Mission Experience

### Space Systems: Mechanical, Orbital, Optical, RF

June 1979 - Present (41 years 4 months)

Planet wide

1. Radarsat - mission definition study and SAR antenna design (CSA)
2. Skynet IV - EHF satcom (UK)
3. Space Based Radar System (DND)
4. Space Based IR (DND)
5. WISP - STS based Wave in Space plasma(CSA)
6. Windii instrument - Freja Satellite with SSC
7. Eureka - Free flying microgravity platform ESA
8. Remote Manipulator System (CSA)
9. Space Station Remote Manipulator and Dextrous Manipulator and Stereoscopic vision
10. Space Station Float Zone Furnace (CSA)
11. On-Orbit Servicing (ESA)
12. Cospass-Sarsat (DND)
13. SPOT - remote sensing (CNES)
14. Lunar and mars mission Planning (CSA)

15. Asteroidal impact deflection (NASA)

16. Multiple Black Bandt suborbital missions (DND, ESA, SSC, Nor)

### John Molson MBA International Case Competition

Judge

December 2001 - Present (18 years 10 months)

Montreal, Canada Area

The John Molson MBA International Case Competition is a not-for-profit event organized by a team of four MBA students from the John Molson School of Business, Concordia University, Montreal, Canada. The competition is open to top business schools worldwide, and is recognized as the largest competition of its kind. Its main purpose is to bridge the gap between corporate and academic worlds, which ultimately enriches both students and executives alike.

The competition format is a round-robin tournament consisting of five business cases. The cases are selected from among the top entries from the annual Case Writing Competition. One of these cases is a live case presentation by a major company about a real-life business challenge that they are currently facing.

the 2019 competition concluded with Nanyang University of Singapore as the overall champion followed By Lund University of Sweden and in third place De Groote School of McMaster University. Congratulations to all.

### Board of Directors

Governance Experience

1993 - Present (27 years)

2015-now Chair, Polar Knowledge Canada, Federal Agency

2014-2016 Canada's Space Advisory Board

2014-now Sigma Energy Storage, Chair

2015-now Anyon Systems, Chair

2013-2014 Canadian Rare Earth Network - Founding Member

2005-2014 Orbite Aluminae (Alumina & Cleantech mining) TSX

2008-2013 Atomic Energy of Canada Ltd(Nuclear energy and technology)

Crown Corporation

2007-2009 Broadsign (Chairman, Digital signage software) Private

2006-2011 JAG Mines (Natural Gas exploration) TSX-V  
2005-now ITSMAX (Intelligent highway technology for public transport)  
Private  
2004-2012 Raymor (Carbon nanowires, plasma surfacing) Public became  
Private  
2001-2013 Mechtronix (Flight simulators) Private and M&A to Textron  
2002-2004 Institut National d'Optique (Photonics, R&D and tech transfer)  
Parapublic  
1999-2003 Autovu (Autonomous optical reading of license plates) Private &  
M&A  
1999-2002 Codagen (Autonomous software writing software) Private  
1999-2002 Nikrom (Nanotechnologies, Metallic resurfacing) Private  
1995-2002 Poetic Tech (Ergonomic and Memory farms cooling technology)  
Private  
1999-2002 Smartsight (IP surveillance camera technologies) sold to Verint  
1998-2001 ExtensoTech (Tourism guide technology) Private  
1997-2001 SMT Hydrasil (Nanotechnologies and surfacing) Private  
1997-2001 PyroGenesis (Nanotechnologies, Cleantech) Private became public  
TSX-V  
1996-2001 Tetra Tech (Fleet managing technology) Private  
1998-2000 AT2/Biogentis (Surgical glue and instruments) Private  
1999-now Géomax (Geomatics) Private  
1996-1998 ART Advanced Research Technologies(Biophotonics and aero  
technologies) TSX  
1992-2008 Visuaide (Technology for the visually challenged) Private became  
Humaware  
1994-1996 Aeroports de Montreal (Management of the Montreal and Mirabel  
Airports)Parapublic  
1993-1996 CLD de la Montérégie (Regional Development Agency) Parapublic  
1993-1996 Centre de Technologies Aérospatiales (Aerospace technology  
research center)  
1985-1990 Advisory Committee of L5 Society (NGO)

## Government of Canada

Inaugural Chairman Of The Polar Knowledge Canada Board

July 2015 - July 2020 (5 years 1 month)

Cambridge Bay, Nunavut

Polar Knowledge Canada, established as a new Canadian Federal independent Agency on June 1 2015, is responsible for advancing Canada's knowledge of the Arctic and strengthening Canadian leadership in polar

science and technology. As a key component of Canada's Northern Strategy, it comprises a pan-northern science and technology program, the Canadian High Arctic Research Station (CHARS) in Cambridge Bay, Nunavut, which was inaugurated in August 2019, and has a knowledge management and mobilization functions. Moreover, it includes the activities of the former Canadian Polar Commission.

Polar Knowledge Canada (POLAR) as Canada's Polar Agency is on the cutting edge of Arctic issues and strengthens Canada's position internationally as a leader in polar science and technology. POLAR also promotes the development and distribution of knowledge of other circumpolar regions, including Antarctica. It will provide a world-class hub for science and technology research in Cambridge Bay, Nunavut called the Canadian High Arctic Research Station (1/2B\$ including operation). As part of Canada's Northern Strategy, POLAR improves economic opportunities, environmental stewardship and quality of life for Northerners including First and Inuit Nations and all Canadians.

Anyon Systems Inc.

Chair Of The Board Of Directors

January 2015 - May 2019 (4 years 5 months)

Montreal, Canada Area

Anyon Systems Inc. is a funded and profitable Canadian technology startup with the mission of building and commercializing modeling and design software tools enabling the accelerated development of a universal quantum communication devices and processors. Quantum computing is a new and promising paradigm in high performance computing in which laws of quantum physics are used to obtain significant computational speed up for efficient solution of some of the most challenging problems in cyber security, big data analysis, molecular simulation, climatology and weather forecasting, petroleum modelling etc. Successful applications of quantum computing to any of these problems will open doors to massive and growing markets. Anyon's QC software tools has entered the Alpha test phase and is expected to be in the Beta test phase with leading market clients by the fall. The software can be used by superconductor, quantum optics and nanotechnology technologies manufacturers and save months to years in developmental schedules.

According to Market Research Media Inc., Quantum Computing market is expected to grow at USD ~2,464 million by 2022, at ~24% of CAGR between 2016 and 2022

The early adopters of quantum computing solutions are government agencies as well as major IT/Defense contractors who are eager to use the power of quantum computing for encryption and decryption and large scale simulation applications. The Canadian Government announced July 30th, 2015 a grant 33.5M\$ for a new research industry-university partnership and clients, headed by U. of Sherbrooke, including Microsoft, Google, and Anyons Systems.

Given such opportunities, Anyon Systems Inc. has positioned itself to produce tools to develop and manufacture universal scalable quantum computer to address the computational need in cyber security, big-data analysis as in weather and climate forecasting, and simulation technologies.

**Sigma Energy Storage Inc.**  
**Executive Chairman and CTO**  
February 2014 - May 2019 (5 years 4 months)  
Montreal, Quebec

Sigma Energy Storage has developed, designed, prototyped and proven a new generation of award-winning transportable, Cleantech, CO2 capturing Hybrid Compressed Air and Thermal Energy Storage (CAES) system meant primarily for remote northern communities where power is produced by hydrocarbon-fuelled generators. It operates at higher pressures and efficiency and swiftly captures the heat generated through a proprietary thermal management system nanotechnologies. The patent pending system can store and restore energy rapidly and be scaled up or down and modularized from a multi-residential size to multiple MWh storage capacity. With a high combined round-trip efficiency, it enables 25,000 of cycles of energy storage at levelized capital cost of energy of a few cents per kWh /cycle. It is transportable and an all-weather system uninhibited by extreme temperatures. SES has developed a Big Data analysis of large grids and developed an Neural Net AI system to predicts power draw peaks.

To achieve such results, the system uses a combination of air compression with an advanced thermal recovery system stores energy for short or long periods, requires less space, with a lower capital cost and offers better operating cost and performance. This technology should have a meaningful impact on GHG emissions, by enabling the utilities to generate less energy from nonrenewable sources to meet their demand peaks. Storing generator power can save some 30% of diesel, such savings can go up, in the 70-80%, if intermittents sources are used jointly. It also enables utilities in taking onto

their grids significantly more non-GHG releasing, albeit intermittent, renewable energies such as solar / wind / tidal.

Sigma has completed, tested its first scaled system and is working with Hydro-Québec, Hydro-Sherbrooke, BC Hydro and NRCan towards a commercial demonstration unit which is to be positioned in Sherbrooke. Québec

## Natural Sciences and Engineering Research Council of Canada (NSERC)

CREATE Internal Selection Committee Member

December 2014 - January 2018 (3 years 2 months)

Ottawa, Canada Area

The Collaborative Research and Training Experience (CREATE) Program supports the training of teams of highly qualified students and postdoctoral fellows from Canada and abroad through the development of innovative training programs that encourage collaborative and integrative approaches, and address significant scientific challenges associated with Canada's research priorities; and facilitate the transition of new researchers from trainees to productive employees in the Canadian workforce. The program is one of the largest at NSERC and generally funds around 17 new centers annually, the funding has a 6-year duration.

CREATE is harnessing the country's deep research and development tradition and helps in translating the graduating scientists to a productive and innovative workforce, enhancing national productivity.

I serve as a physics and photonics, materials, natural resources and energy, environment, ecology, and ocean expert. Representing industry.

## Innovation, Science and Economic Development / Innovation, Sciences et Développement économique

Canada's Space Advisory Board Member

December 2014 - October 2016 (1 year 11 months)

Reporting to the Minister of Innovation, Science and Economic Canada, the Board provides advice on the Canadian Space Agency (CSA) space program and land based Astronomy. Including strategic advice on a vision for the L/T commitment to space of the Canadian Government, space-based solutions and their commercial success.

As outcome, the Minister has recently announced Canada's participation extension to the space Station until 2024, The novel Radarsat constellation of satellites, a new ESA Comsat technology program participation, a participation in the new world-class Thirty Meter Telescope to be built on Mauna Kea besides the actual Canada-France-Hawaii large aperture telescope. Canada is also continuing its participation in the James Webb Space Telescope. The budget of CSA is about 350M\$ per annum.

Orbite Aluminae Inc.

President, CEO and director

August 2005 - February 2014 (8 years 7 months)

St-Laurent, QC

Grown a start-up into a technology leader in circular economy with a mining and cleantech expertise. invented, conceived, developed and patented an innovative metallurgical/chemical process enabling the environmentally clean production of alumina from various aluminous ores, the sustainable transformation of industrial and mining wastes (Red Mud, Fly Ash...) into a series of metallurgical (Al, Fe, Si, Ti, ...) products and of the co-located rare metals products including rare earths (REE) and rare metals (Ga, Sc, ...).

Raised over \$140M of innovative financing from institutional and government sources and directed a knowledge-based publicly traded start-up to reach a valuation of more than \$1/2B and, that generated 13 patents as well as more than 67 pending. Listed amongst the 50 Top public corporation in Quebec by Les Affaires and in the 300 top Canadian listed firms by the Globe and Mail. Principal author of the IP portfolio. Because of which, Orbite was recently selected to be amongst the 20 most innovating firm by the Canadian Innovation Index.

Negotiated deals with MicMac first nation for the operations of a natural resources operation in the Gaspé peninsula successfully traded for the pipeline delivery of natural gas from a local source.

Resulting in roughly 567% market share gain over tenure, representing a CAGR of roughly 35% per annum. Developed relationship agreements and partnerships with aluminium producers such as RUSAL (smelter-grade alumina), an off-take contract with Glencore (smelter grade alumina), as well as with the environmental services world leader Veolia (for sustainable treatment of Red Muds and coal combustion residual Fly-Ashes). Development of a Pilot facility and of a circa \$100M High Purity Alumina commercial

production facility. On-boarded a highly effective quality team. [http://en.wikipedia.org/wiki/Orbite\\_Aluminae](http://en.wikipedia.org/wiki/Orbite_Aluminae). [http://en.wikipedia.org/wiki/Red\\_mud](http://en.wikipedia.org/wiki/Red_mud)

## AECL

### BOD Member

January 2007 - April 2013 (6 years 4 months)

Atomic Energy of Canada Limited, a crown-corporation, is Canada's premier nuclear science and technology organization. For over 60 years, since the Manhattan project, AECL has been a world leader in developing peaceful and innovative applications from nuclear technology through its expertise in physics, metallurgy, chemistry, biology and engineering. It developed the CANDU 6-800 MW class heavywater and the smaller Slowpoke reactors, the sole nuclear energy technology capable of burning naturally occurring Uranium (and Thorium) without reverting to enrichment and without producing climate changing CO2 and Greenhouse Gasses (GHGs). 22 reactors were built in Canada providing some 15% of the country's power requirement at a 5-8 cents per kW/hr cost. There are CANDU-type units operating in India, Pakistan, Argentina, South Korea, Romania and China. The technology can burn the cheaper and more prevalent element Thorium as tested in China and soon in India. While in tenure, the BoD successfully divested the CANDU business unit to SNC-Lavalin and supervised the repair and bringing back the world-leading Chalk River medical isotope reactor, developed the EC6 reactor concept and set AECL with a new structure as a GOCO. Served on the Audit, Chalk River oversight and Technology committees. [www.aecl.ca](http://www.aecl.ca) and [en.wikipedia.org/wiki/CANDU\\_reactor](http://en.wikipedia.org/wiki/CANDU_reactor).

AECL installed in many Canadian cities centers, within universities, SLOWPOKE Small Nuclear Reactors. utterly stable and handled by universities. This is an older technology that may come back.

Developed a concept for the green processing of heavy oil sands in Alberta using a thermal Candu.

## Mechtronix Systems Inc.

### BoD director and Head of Audit Committee

2000 - 2012 (12 years)

Mechtronix is a private world leader in civilian flight simulation; offering a complete range of products from 2D training tools and FTDs to Full Flight Simulators (FFS) Level D, has extensive experience in the flight simulation business and a well implemented worldwide support network. During tenure,

the firm went from a start-up providing training tool to the second largest full-flight simulator corporation in the single aisle aircraft category (B737, A320 families) generating circa 10x in shareholder value growth over tenure. It was recently sold to the US based Textron conglomerate (operating now under TruSimulation) with 350 employees. <http://www.mechtronix.com/home/>

## Technologies Aérospatiales Inc

CEO

February 1991 - January 2010 (19 years)

Montreal, Canada Area

Within Aerospace sector: Performed contracts for ESA in automation and robotics, optics, microgravity and international Technology Transfer mechanisms; CNES and France's DGA on remote sensing technology; CSA on moon and mars exploration missions; Intellectual property (IP) technology transfer; NASA committees and workshops on asteroidal-earth impacts and avoidance strategy; Microgravity Processing and planetary In-Situ Resources Utilisation (ISRU); and process development for lunar illmenite; at the Canadian Royal Military College, introduced space specialty program involving the novel milspace operations curricula.

In the management sector: Consulted on the M&A of large European and American aeronautics and aerospace conglomerates.

In the energy sector: Studied and modeled Space Power Systems (SPS) and created Space Relay Transmission of power (SPR) clean technologies, Lagrange Point Solar Flares vulnerability, detection and associated warning technology for Hydro-Québec and Hydro-Ontario; but also with power grids stability and oil and gas prospection.

In the advanced materials sector was involved advising 5N+ (semiconductors) and Canadian Electronic Powder (CEPC) Tantalum electronics and on the development and applications of Single and Multiple Walls Carbon Nanotubes resulting in a high throughput production line.

Client list included large Japanese and European firms such as IHI, Nippon Steel, Matra-Marconi and Société européenne de propulsion (SEP), and Canadian DMR. Worked as Advisor to the Québec's Ministry of Industry on aerospace and robotics affairs.

Developed strategic and business plans for the CSA, DMR, ATS Aerospace, Lockheed, Lockheed-Martin, Matra, Instrumar, C-CORE and provincial governments. Served as expert on technology transfers and intellectual properties for the European and Canadian Space Agencies. Throughout his career, he has participated directly as a principal to more than 13 space missions/satellites and aircraft programs.

## Humanware

Director, Board of Director

1981 - 2005 (24 years)

Drummondville, Quebec

For over 25 years, HumanWare's inspirational vision has resulted in a range of highly intuitive and intelligent solutions that empower people with visual impairment and learning disabilities by giving them the independence to participate effectively within a sighted world. Served on the Board and the audit committee as well as a Strategic advisor. The corporation began as a not-for-profit start-up distributing technologies to the blind and low-vision communities, it then became a private firm financed by venture capital, to become the most innovative and the largest low-vision technology manufacturer and distributor. It is of recent part of the Essilor group.

## ART Advanced Research Technology Inc.

CTO and VP Strategy

November 2000 - April 2004 (3 years 6 months)

Public firm using a proprietary infrared optical technology to create and market biomedical and pre-clinical pharmaceutical bio-optical imaging devices. The firm at the onset was a start-up, then graduated to be traded on TSX stock exchange and had a market cap of approximately \$100M at the end of tenure. Hired to effect a technology turnaround and divest a business unit.

Developed high speed time-domain fluorescence bio-optical platform used in breast cancers and new drugs investigations small animal imagery system; Quantum dots applications to molecular imagery; Ti-saphir lasers.

Established the corporate strategy, R&D, engineering and business development functions. Conceived and developed new products in Optical Molecular Imaging in 14 months (3 patents). Product accounted for all of the firm's revenue. Negotiated commercial licensing deal with GE Medical for two products. Raised two rounds of more than 17MUSD in financing.

Divested the ISIS division at 5x sales to Photon Dynamics (based in California). Was pivotal in firm's IPO (24M\$ in strategic and institutional investors, \$35M in TSX IPO and prepared for a NASDAQ listing) increasing market capitalization from \$20M to \$200M in 36 months.

Optix small-animal imager has become a technology quality standard in the market picking up more than 10-15% market share with more than 50 units fielded. Developed inverse-solution image reconstruction technique. Research dealt also with the mechanics and biophysics of cancerous cells.

### PyroGenesis Canada

CEO, CRO

2003 - 2004 (1 year)

Montreal, Canada

A cleantech and advanced material firm dedicated to the application of thermal plasma technology for aerospace depositions and the oil and natural resources industries to solve important environmental/energy problems. It also produced nanomaterial such as Bucky balls and carbon nanofibers and nanowires. Involved also in Clean technology to treat municipal and ship wastes using high temperature plasmas, sold systems to US Navy and Caribbean Cruises. The firm is presently publically traded TSX-V. [www.pyrogenesis.com](http://www.pyrogenesis.com)

### Caisse de dépôt et placement du Québec

Venture Advisor, SOFINOV

February 1995 - November 2000 (5 years 10 months)

#### INSTITUTIONAL FINANCE

Executive level Venture Advisor for Caisse de dépôt et placement du Québec's (CDP – \$132B in assets then) primarily for Sofinov (\$1B in assets) and in support to Capital Communications (\$2B in assets). Responsible for managing venture capital equity investment in high technology industrial companies, specifically materials, aerospace, cleantech and energy ventures including energy storage systems such as fuel cells.

Developed and managed more than 22 international investment projects commitments worth in excess of \$110M, with an orientation towards new economy. Generated more than 200 investment leads. Enabled CDP's investment in an aerospace-oriented US Venture Capital (USVC) fund (Spacevest) for \$40M. Served on seven Boards of Directors for CDP. Developed a tech valuation model for CDP venture funds. <http://www.lacaisse.com/en>

## International Space University

Co-Chairman, resources and manufacturing department

1988 - 1997 (9 years)

The ISU is an international non-governmental organisation providing a post-graduate education on space issues. Every summer, the selective program attracts 130 young space professionals from 30 countries. ISU is now also located in Strasbourg as a research and education university with a full year graduate program as well.

Member - Board of Governors and Founders

Member - Board of the Canadian Foundation for ISU

Faculty member, robotics, microgravity processing and space resources

## Centre technologique en aérospatiale - CTA

Founder and CEO

1993 - 1996 (3 years)

St-Hubert, Canada

Established a federally-provincially financed research and technology-transfer center of excellence in aerospace with aim of transferring aerospace and materials technologies to SMEs to increase their growth and profitability. Projects in light aircraft design, aerospace metallic and composite structures, flight and aircraft maintenance simulators were carried out. A successful start-up incubator was established. Located near the Canadian Space Agency (CSA) and École Nationale d'Aéronautique on the St-Hubert airport near Montreal.

Responsible for implementation and management of Centre de technologies aérospatiales (CTA) a para-governmental R&D centre of excellence.

- Centre with one of highest levels of self-financing in the province and country.
- CTA was self-financed in initial year with low initial capitalisation.
- Five year business plan accomplished in less than three years.
- Built-up client loyalty and satisfaction to high levels with a high contractual repeat rate (>3.3).
- Developed and established a successful technological enterprise incubator, with two (2) firms receiving VC funding

## ADM Aéroports de Montréal

Member Board Of Trustees

February 1993 - June 1995 (2 years 5 months)

Montreal, Canada Area

The board is involved in the policy and strategy of the corporation managing the 3 Montréal area airports. Concentrated the airports into the Montreal-Trudeau airport. Providing room for the aerospace industry at the 2 others. Was key to change management required with elected officials to support the consolidation.

### CRE Montérégie

Board Member

September 1992 - April 1995 (2 years 8 months)

Longueuil

An elected body managing the Montérégie region south of Montreal.

### C-CORE, Memorial University

Executive Advisor

1990 - 1992 (2 years)

St-John's, Newfoundland

As consultant to C-CORE, founded and set up an original research center under the auspices and financing of the European Space Agency in St-John's NF with Prof. Jack Clark. The primary goal of the center was the use of Arctic, Ocean and Extreme Environment conditions to drive the design of advanced engineering technologies. The center is called CIRUS and was created within the C-CORE center located at Memorial University. The center's objectives were to study surface and interface physics using low-gravity and enable the comparative study of extreme environments of oceans and space. The projects were centered on enhanced oil recovery (with a Calgary research group), the thermodynamic modelling of oil reservoirs and studied foam stability with ELF-Aquitaine. The Canadian Space Agency came also in funding the center and provided two Get-Away Special canisters (GAS cans) on the space shuttle to carry out the experiments. It was involved also in Ice and Climate Physics research.

### Oerlikon

Director, Aerospace Systems

August 1989 - 1992 (3 years)

St-Jean, Canada

An international high-technology company specialised in the development and integration of air defence systems based in Switzerland. Responsible for the development of a diversification unit involved in space technology at Oerlikon Aerospace. Awarded contracts from the Canadian Space Agency on dextrous robotic devices (DEXTER or SPDM) and other on the exploration of

a Canadian contribution to a future international Moon-Mars mission. Sat on external NASA committees for the in-situ uses of local resources (ISRU) and processing ores on the Moon, asteroids or Mars to produce oxygen, fuel and water.

## Canadian Astronautics Limited

Sr. Staff Scientist

1984 - 1989 (5 years)

Join the early phase start-up in space engineering, developed 8 different satellites and space station programs ranging from Radarsat, SPOT, to military telecom and remote-sensing platforms to a variety of scientific payloads and satellites. Grew to 200 persons before being sold to EMS technologies.

Developed software to position distressed individuals/pilots using Doppler shift of emergency beacon on the radio emission on the Cospar-Sarsat satellites. This system has saved more than 500 lives as of last, through the space detection and location of emergency beacons (121.5 and 243 Hz). Developed and flown energy storage devices such as NiMH batteries.

Established new ventures for CAL in space technology and space utilisation (microgravity) growing to finally 25% of the revenues of the firm. Was leader in developing microgravity material processing float-zone furnace technologies for high-purity germanium, gallium-arsenide (III-V) semiconductors now flown on the space station. Developed on protein crystallisation, encapsulation of Beta-cells (diabetes) and electrophoresis separation of long chain pharmaceuticals in low-gravity. Trained on NASA's KC-135 parabolic flight aircraft simulating low-gravity. Developed Moon-Mars mission scenarios for the interdepartmental committee on space (prior to CSA's emergence).

Provided design for equipment mounting and operational aircrafts and helicopters involving obtaining the required Transport Canada authorisations.

## Ottawa University

Faculty

September 1985 - May 1986 (9 months)

Mechanical Engineering

Lecturer Mechanical Engineering. Part-time.

## Université de Sherbrooke

Professor of aerospace and mechanical engineering

1982 - 1984 (2 years)

Sherbrooke, Canada

Professor of aeronautics and mechanical. Developed an undergraduate specialty program within the Mechanical engineering department in partnership with Pratt&Whitney Canada and Bombardier Aerospace. A first in Québec, the project also included an international faculty exchange program with Ecole Polytechnique in Paris, ENSICA and Sup'Aéro in Toulouse. Developed a complete aircraft design curricula involving DeHaviland Aircraft (now Bombardier). Produced refereed research and publications in fluid dynamics including the aerodynamics of Darrius type windmills (used by NRCC & Hydro-Québec), racing sailboats (North Sails), racing cars and transonic wingform (Bombardier). Acted as an aeronautics expert for the media and expert witness for administrative courts.

Organized the Sherbrooke International Airshow with a mixed pageant of civilian and military aircrafts from Canada and the US in 1983 and 84

Canadian Forces

Defence Scientist

1981 - 1982 (1 year)

Defence Research Establishment Valcartier, Canada

Computation Fluid Dynamics (CFD), Internal and Store Aerodynamics and Ballistics, Simulation of missiles in warfare scenarios, Vulnerability assessments.

Cornell University

Graduate Teaching Assistant

1980 - 1981 (1 year)

TA on undergraduate Mechanical engineering courses. Replaced leaving faculty on teaching graduate Fluid Dynamics class. Was TA on graduate Quantum Mechanics Course in Physics using the then novel Cohen-Tanoudji text.

CAE

Aerospace Simulation Engineer

1979 - 1980 (1 year)

World leading manufacturer of flight and marine systems simulators. Involved in modelling engines and aerodynamics for military and commercial aircraft simulators. Coding in machine language and Fortran. Simulation of space robotics systems. Left to attend graduate school at Cornell University.

## University of Waterloo

Research and teaching staff - Physics

June 1978 - August 1978 (3 months)

Waterloo, Canada

Under a National Grant from NSERC. Working with Prof. Pim Fitzgerald. Involved in Globular Cluster astrophysics, supporting undergraduate astronomy classes. Participating to an International Solar Energy Workshop and a Princeton Astrophysics conference.

## Université de Montréal

Optical and Astronomy Research Associate

May 1977 - August 1977 (4 months)

Physics Department

Design, planning and performing optical engineering acceptance tests and civil engineering on the OMM 1.6 m. Ritchey-Chretien telescope located at Mt-Megantic. Site location studies for the OMM. Optical modelling. Astronomical instruments design and testing. Under Prof. René Racine, father of the Canada-France-Hawaii Telescope located near the summit of Mauna Kea mountain on Hawaii's Big Island at an altitude of 4,204 meters (13,793 feet), and is one of the observatories that comprise the Mauna Kea Observatory. Operational since 1979, the telescope is a Prime Focus/Cassegrain configuration with a usable aperture diameter of 3.58 meters.

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## Education

### Cornell University

Professional M. Eng., M&AE, Space Physics · (1980 - 1981)

### Université de Sherbrooke

MBA, Innovation management, international economics and finance · (1995 - 1998)

### Massachusetts Institute of Technology

Short Course, Technology and Sustainability · (2017 - 2017)

### Université de Sherbrooke

2 Graduate Degrees, Environmental Science and Sustainable development · (2015 - 2019)

### Massachusetts Institute of Technology

EDX program · (2014 - 2014)