

CNDN Start-ups

CMC-provided infrastructure contributes to start-ups

2020-21 | OUTCOMES OF CANADA'S NATIONAL DESIGN NETWORK® (CNDN)

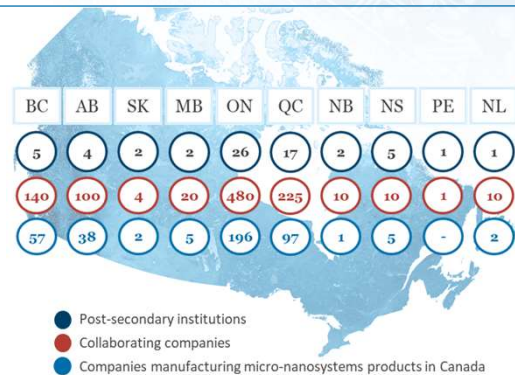
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About CMC

CMC Microsystems is a not-for-profit organization founded in 1984 to simplify access to state-of-the-art design, manufacturing, and testing facilities for advanced technologies. With headquarters in Montreal and offices across Canada, the organization manages Canada's National Design Network® – a Major Science Initiative in collaboration with over 60 universities and colleges to connect 4,000 academic researchers, 6,000 student users and 1,000 companies.



Canada's National Design Network (CNDN)

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CMC helps researchers and industry across Canada's National Design Network® (CNDN) develop innovations in microsystems and nanotechnologies.

The **10-year** survival rate for CNDN enabled start-ups is **80%**, far better than the typical rate of about 45%.*



*After 10 years, the business survival rate for the goods-producing sector was 47.8 percent, compared with 42.9 percent for the service-producing sector. Source: Statistics Canada, Canadian Centre for Data Development and Economic Research, National Accounts Longitudinal Microdata File. Key Small Business Statistics, January 2019: https://www.ic.gc.ca/eic/site/061.nsf/eng/h_03090.html#point1-3

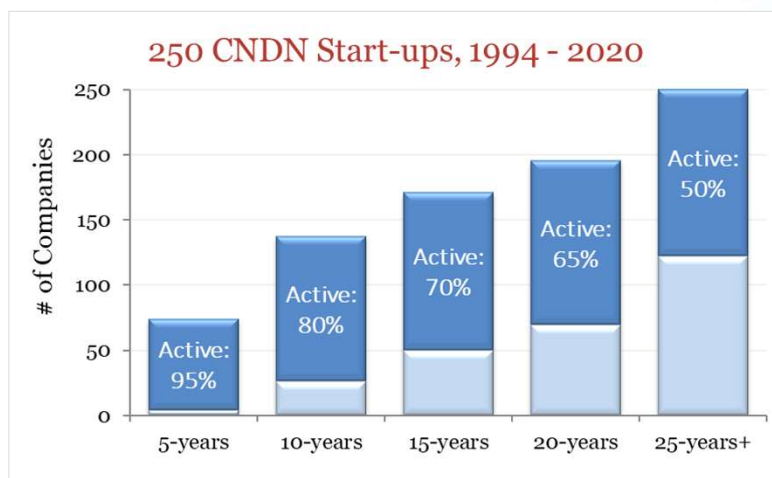
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250 Start-ups over 25 years



CMC-provided infrastructure contributes to start-ups

- Start-ups active in Canada.
- Start-up companies based on actual data only.
- Company names not specified prior to 1999.
- Inactive status: acquired, dissolved or unknown (as of July 2021).

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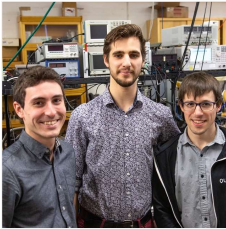
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CNDN start-ups – www.CMC.ca/SuccessStories

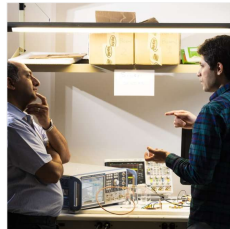
A quantum sensor for
the mining sector



SBQuantum

Université de Sherbrooke
Dr. David Roy-Guay

Intelligent antennas for
the Internet of Things



SenZIoT

University of Alberta
Dr. Pedram Mousavi
Dr. Rashid Mirzavand

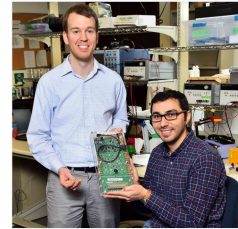
Developing ultra-sensitive
vibration sensors



**axSense
Technologies**

Simon Fraser University
Dr. Behraad Bahreyni

Rapid sensing that targets
bacterial infections



Micromensio

University of Toronto
Dr. Brendan Crowley
Dr. Enver Kilinc

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CNDN start-ups – examples:



Frontier Fluidics

**METABOLIC
INSIGHTS**



**Nord
Quantique**



Wireless Fluidics

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Proud to support the innovative work of researchers in Canada.

Nano research yields sensing breakthrough – (University) Nanofabrication capabilities helped Queen's University researchers develop a novel, highly sensitive portable biosensor that can be manufactured simply and inexpensively. Their technology now forms the basis of an award-winning start-up company, **Spectra Plasmonics**. Sophisticated equipment and a controlled cleanroom environment, coupled with the expertise of lab staff, were key to their success, Josh Raveendran says.

Resolving a Quantum Conundrum - Nanomechanics specialist John P. Davis and his students developed the first digital photodetector capable of measuring the quantum properties of nanomechanical systems. Their instrument, now on the market through their start-up company **Resolved Instruments**, opens new opportunities in the emerging field of quantum technologies. CMC has helped his team throughout the R&D process, he says. CMC helped them fabricate early designs through international silicon photonics foundries, until the need for faster iterations led them to the University of Alberta's nanoFAB facility. Today they continue to benefit from design tools provided through CMC.

Novel transceiver paves the way for a battery-less future - Imagine never having to recharge your wireless device. That's the future envisioned by **SPARK Microsystems**, a start-up commercializing a low-power, short range wireless transceiver that could be a game-changer in the evolution of the Internet of Things. "CMC allowed us to do cutting-edge research at a fraction of what it would have cost. We could afford to make prototypes, test them, and iterate the process. This enabled us to find our solution more quickly." "We could not have done this without CMC. Canada should be proud to have this institution and I hope it is around for many years to come."
- Frederic Nabki (Co-founder)

New direction for a dependable dish - Neil Roy Choudhury and Hamid Sadabadi, Concordia University graduates, leveraged their mutual expertise in microfluidics and biosensing to create their Calgary-based start-up, **Frontier Fluidics**. Sadabadi notes that CMC has been very supportive of the company and their research lab by providing software and financial assistance for chip fabrication. "This was critical to the success of Frontier Fluidics," he says.

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CNDN Industry Study

Research, development & innovation in context



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Companies and Canada's National Design Network (CNDN)

University-industry collaborations: From seed to scale-up, over **1000** Canadian companies are collaborating with professors &/or hiring CNDN talent – collaborations include start-ups, SMEs, and multinationals. The CNDN Industry Study is a systematic analysis of companies in Canada that gain value from microsystems and/or nanotechnologies. This list is based on CMC Microsystems (CMC) client reports of companies supporting research and hiring graduate students, **founding start-ups**, collaborating with researchers on R&D projects and/or prototyping designs – it does not include all companies involved in the microsystems space.

CNDN start-ups represent 10% of the 1000 companies.

- Public data sources are used to obtain information in the CNDN Industry Study.

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96 Start-ups in CNDN Industry Study

10 years: 137 start-ups reported by CNDN participants

- 80% remain active in Canada.

96 start-ups are in CNDN Industry Study 2021

- \$43.5M in annual revenue is generated by 32 (of 96) start-ups.
- 680 employees are working for 79 (of 96) start-ups.
- 34% hired highly qualified personnel (HQP) from within CNDN.
- 65% deliver products where microsystems are the core business.

96 CNDN Start-ups*



*CMC-provided infrastructure contributed to start-up company.

n = 96 start-ups

Companies in study: 932 | Assessment performed: 2021

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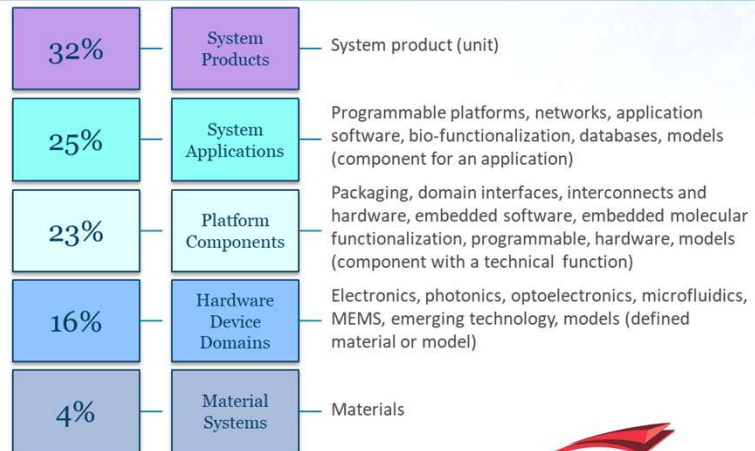
Supply chain value-add according to products

32% of start-ups* offer System Products – finished product(s) that may incorporate several system applications.

*CMC-provided infrastructure contributed to start-up company.

n = 96 start-ups

Supply Chain Positions



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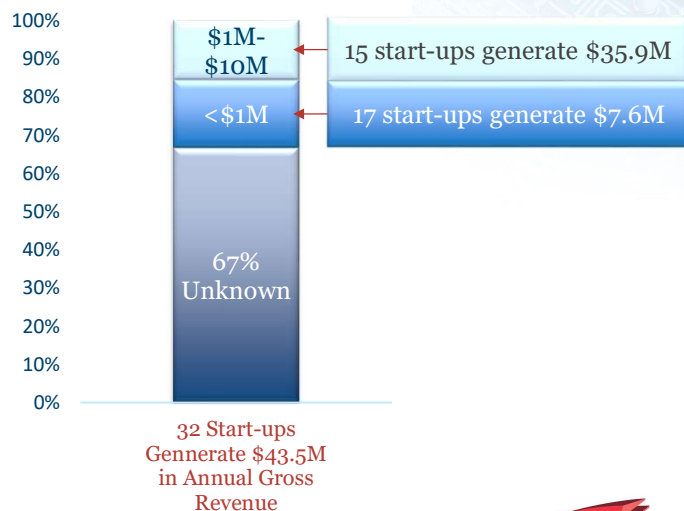
Canadian revenue

\$43.5M in revenue is generated by 32 (of 96) start-ups.*

*CMC-provided infrastructure contributed to start-up company.

n = 96 start-ups

CNDN Start-ups: Revenue



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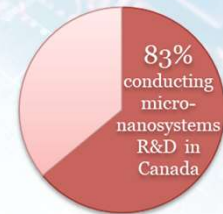


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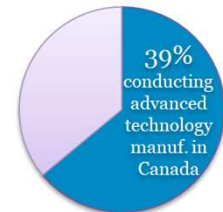
Innovation in high growth sectors



n = 96 | Start-ups map to 1 or more sectors.



Research & Development



Advanced Technology Manufacturing

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5 years: 74 Companies

"CMC played an important role both in terms of facilitating microchip fabrication and providing consult for wire-bonding and packaging," says Hossein Kassiri, Professor, York University.

Kassiri and his business partner, Nima Soltani, founded **Braincom Inc.**, (a University of Toronto start-up) to commercialize their wearable medical device.



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CMC-provided infrastructure contributes to start-ups

Impact	2016	2017	2018	2019-20*	2020-21	5-year:
Start-up companies**	16	15	20	9	14	74

Start-up Companies Reported in 2020-21

Company	University	Company	University
AquaSensing	University of Waterloo	NerveX	University of Toronto
Bio6	Université Laval	NovusTx Devices	Lakehead University
BioGraph Sense	University of Waterloo	Scope Photonics	University of Waterloo
ELeapPower	University of Toronto	PiAndPower	University of Waterloo
Gold Sentintel	University of Waterloo	Tidal Medical	University of Waterloo
Nord Quantique	Université de Sherbrooke	Wave View Imaging	University of Calgary
Northern Quantum Lights	University of Waterloo	[undisclosed]	McGill University

* Change to fiscal year reporting for consistency with funder reporting cycles.

**Startup companies based on actual data only. Revised: 2021-07-21

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Start-ups: 2019-20

Impact	2015	2016	2017	2018	2019-20*
Start-up companies**	21	16	15	20	9

Start-up Companies Reported in 2019-20

Company	University	Company	University
ALPHAXON	University of Waterloo	PulseMedica Corp.	University of Alberta
CliniSonix Inc.	University of Alberta	Sonus Microsystems	University of British Columbia
Dream Photonics	University of British Columbia	Tartan AI	University of Toronto
Metabolic Insights	Simon Fraser University	2704304 Ontario Limited	University of Toronto
MISO Chip	Polytechnique Montréal		

* Change to fiscal year reporting for consistency with funder reporting cycles.

**Startup companies based on actual data only. Revised: 2020-01-08

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Start-ups: 2018

Impact	2014	2015	2016	2017	2018
Start-up Companies*	13	21	16	15	20

Start-up Companies Reported in 2018

Company	University	Company	University
AgileMMIC	University of Calgary	MYCIONICS	Western University
All Waves Technologies	Université de Sherbrooke	nPLex Biosciences	McGill University
CleanTech Geomechanics	University of Waterloo	SenZioT Technology	University of Alberta
DropGenie	Concordia University	SHIELD Crypto Systems	University of Toronto
DropTissue BioTech Inc	University of Calgary	Smart EDA Technologies	University of Guelph
Durabrace	University of British Columbia	SmartRF Inc.	University of Calgary
Get Smart Analytics	University of Ottawa	Tibor Designs	University of Ottawa
Harvest Systems Inc	McMaster University	VisuCyte Therapeutics Inc. (VCT Inc.)	University of British Columbia
Mazlite	University of Toronto	VueReal Technologies	University of Waterloo
Micromensio	University of Toronto	Ziprprint	University of Alberta

* Startup companies based on actual data only.



Start-ups: 2017

Impact	2013	2014	2015	2016	2017
Start-up Companies*	14	13	21	16	15

Start-up Companies Reported in 2017

Company	University	Company	University
44N Ocean Research Technology	Dalhousie University	Neuraura Biotech Inc	University of Calgary
AdHawk Microsystems	University of Waterloo	Pronto Medical Technologies	McGill University
axSense Technologies	Simon Fraser University	SkyTrace Technologies	University of Ottawa
Boa Photonics	University of Ottawa	SR Microsystems	University of Toronto
Corporation Photon Inc.	Université de Sherbrooke	Spectra Plasmonics	Queen's University
Criticare DX	University of Calgary	Wireless Fluidics	University of Calgary
Frontier Fluidics	University of Calgary	Yetiware	-
Millview Photonics	University of Ottawa		

* Startup companies based on actual data only.



Start-ups: 2016

Impact	2012	2013	2014	2015	2016
Start-up Companies*	12	14	13	21	16

Start-up Companies Reported in 2016

Company	University	Company	University
ANANDA	McGill University	QuantWave Technologies	University of Waterloo
Braincom, Inc.	University of Toronto	Resolved Instruments	University of Alberta
Formi3DP	Western University	Savormetrics	University of Waterloo
Hangzhou Tanzhen Nanotech Co.	University of Waterloo	SineFilium	ETS
IR&T Inc.	Université de Sherbrooke	SPARK Microsystems	UQAM
Meta-k	Université de Sherbrooke	Spectrafy	University of Ottawa
Motsai	McGill University	Tecium Designs	University of Toronto
		Trispectra Innovation	University of New Brunswick

* Startup companies based on actual data only.

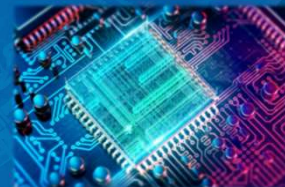
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www.CMC.ca

Lowering barriers to technology adoption



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Academic and Industrial Support to world-class platforms



CAD

State-of-the-art software for successful design

- ✓ Computer-Aided Design tools and design environments
- ✓ A secure, distributed private cloud for hosting
- ✓ User guides process design kits (PDKs), application notes, training materials, courses



FAB

Simple access and reduced cost for working prototypes

- ✓ Multi-Project Wafer (MPW) services through a global supply chain for
 - Microelectronics down to 12nm
 - Silicon photonics
 - MicroElectroMechanical Systems (MEMS)
 - Nanofabrication
- ✓ Expert assistance for first time right designs
- ✓ Packaging and assembly services



LAB

Tools for test and demonstration

- ✓ Platform technologies to speed your research
- ✓ Test equipment loans for short term needs
- ✓ Technical contract services including quantum coding
- ✓ Constructing research networks
- ✓ International partnerships for unique needs



Virtual Incubator Environment (VIE) for start-up companies

CMC's VIE program simplifies access to advanced technologies for researchers at universities, start-ups, and small and medium-sized enterprises (SMEs).

- > Areas of engineering expertise include microelectronics, photonics, MEMS, microfluidics, embedded systems (hardware and software for Artificial Intelligence (AI) and Machine Learning (ML) applications), and more.
- > In 2020-21, over a dozen private companies joined CMC's virtual incubator program for access to software tools and state-of-the-art fabrication.





Design tools, state-of-the-art fabrication, & testing services

CAD

Design and Simulation tools,
cloud access, tech support



FAB

University lab-based prototyping and
commercial Multi-Project Wafer (MPW)
services for microelectronics,
photonics, MEMS



LAB

Engineering and R&D support
(10 engineering hours)

Access to test equipment,
CPU/GPU computer clusters,
and quantum computers

www.cmc.ca/VIE



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Research excellence → Innovation



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