



FABrIC

Network Strategy

Propulsé par CMC Microsystèmes
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FABrIC

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FABrIC is a five-year, \$223M project to secure Canada's future in semiconductors. FABrIC will lower barriers faced by Canadian companies to develop semiconductor manufacturing processes, to create semiconductor Internet-connected products and services (IoT), and to export into a global market.

FABrIC will build the national ecosystem and foster collaboration between industry, not-for-profits, academics, and government and leverage Canada's technological reputation, strengths, and existing assets.



Powered by CMC Microsystems

In its 40-year history, CMC Microsystems has been at the forefront of technological change, managing federal and provincial government investments to introduce advanced technology, to support research, and to impact Canada's industrial high-tech landscape.

Acknowledgements

FABrIC is an Innovation, Science and Economic Development Canada ([ISED](#)) Strategic Innovation Fund (SIF) investment.



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FABrIC

Canada's Semiconductor Ecosystem, Accelerated

FABrIC is a five-year, \$223M project to secure Canada's future in semiconductors. FABrIC is funded through ISED's Strategic Innovation Fund (SIF) with up to \$120M in total funding and is led by CMC Microsystems. FABrIC will lower barriers faced by Canadian companies who develop semiconductor manufacturing processes, create semiconductor Internet-connected products and by services (Internet of Things (IoT)), and participate in the global semiconductor market. FABrIC will build a national ecosystem and will foster collaboration between industry, not-for profits (NFPs), academics, and government in the development of specialized Canadian semiconductor fabrication capabilities and the development and commercialization of new Canadian semiconductor-based products.

Strategic Objectives

ECOSYSTEM AND COLLABORATION

- ✓ Create a vibrant and sustainable ecosystem that provides networking, training, and collaboration opportunities which enable Canadian industry, NFP's, academics and researchers to work together to advance and accelerate semiconductor product commercialization and the development of semiconductor technology and related intellectual property (IP) for the benefit of Canada.

FABRICATION SUPPLY CHAIN CAPACITY AND CAPABILITY

- ✓ Develop widely accessible semiconductor fabrication capacity and capability in Canada to strengthen and deepen Canada's supply chain for the design, prototyping, fabrication, assembly, and test of new advanced sensors and other made-in-Canada semiconductor products addressing the Internet of Things (IoT) market. Key areas of focus are photonics, microelectromechanical systems (MEMS), compound semiconductors, quantum/superconducting devices and related advanced packaging and test technologies.

NEW ADVANCED SENSOR AND SEMICONDUCTOR PRODUCTS

- ✓ Foster the growth and expansion of companies developing and commercializing advanced sensors and other semiconductor products and services in Canada targeted at the rapidly growing and strategically important IoT market with direct applications in clean tech, electrified vehicles, 5/6G data communications, healthcare, agriculture, biotech, mining and other strategically important sectors in Canada.

ACCELERATE QUANTUM APPLICATIONS

- ✓ Accelerate the development of quantum-ready companies and quantum computing applications in Canada by providing access and technical assistance to small/medium sized enterprises (SMEs) and academics for quantum-based hardware and software development and prototyping.

SECURE PIPELINE OF HQP

- ✓ Train and create a sustainable pipeline of highly qualified personnel (HQP) with critical skills required for product development and manufacturing roles in Canadian semiconductor companies.

CANADIAN INTELLECTUAL PROPERTY

- ✓ Create related Canadian intellectual property (IP) and commercialize this IP for the benefit of Canada.

SUSTAINABLE INNOVATION PLATFORM

- ✓ Provide a sustainable FABrIC Innovation Platform for Canadian academics, researchers, and SMEs which provides them affordable, timely access to state-of-the-art semiconductor design tools (CAD), fabrication and assembly technologies (including access to global supply chains), test and characterization tools, and technical expertise in product development and manufacturing needed to train HQP and to advance novel product and device development projects.

RESILIENT SUPPLY CHAIN

- ✓ Enhance national security and resiliency in the supply of critical semiconductor products and technologies by creating an enhanced supply chain with trusted Canadian partners and an increased pool of highly trained specialists in semiconductor product design and fabrication technologies.

INTERNATIONAL COLLABORATION

- ✓ Promote international collaboration and partnerships to attract international investment and HQP to Canada and to exchange knowledge and best practices related to semiconductor fabrication, product development, and supply chain.

Strategic Activities

FABrIC has been structured with four major activities aligned to the strategic objectives.

- 1) Development of the Ecosystem
- 2) Semiconductor Fabrication Challenge Projects in the following key technologies, (including related advanced packaging and test technologies)
 - Photonics
 - MEMS
 - Compound Semiconductors
 - Quantum/Superconductors
- 3) IoT Product Development Challenge Projects
- 4) Innovation Platform delivery

FABrIC Ecosystem

FABrIC builds on a network of diverse members from across Canada who share interest in the semiconductor sector. Ecosystem development activities will facilitate matchmaking, knowledge exchange, and collaborations between industry (SMEs, MNEs, etc.), NFPs, academics, researchers, and government agencies to accelerate and support the development of the ecosystem. Activities focus on attracting members from underrepresented communities from across Canada as well as attracting members from various end user sectors. Calls for Challenge Projects in both semiconductor fabrication and IoT product development will support and enable the growth and scale-up of Canadian SMEs, NFPs and start-ups. FABrIC's unique pan-Canadian Innovation Platform will support academic research and the development of HQP in the sector through training programs, and by providing members with access to state-of-the-art design (CAD) tools and semiconductor prototype manufacturing. The Innovation Platform will further support the development of HQP by providing upskilling and reskilling training. The Platform will also accelerate Canada's readiness for quantum computing by providing technical support and access to quantum computing infrastructure to SMEs and academics.

Membership:

Membership will be structured with both free and paid subscriptions. Free subscriptions will be open to all organizations and individuals, including professionals, academics, researchers, students, and industry experts with interest in the sector. Additional paid subscriptions will be open to academics, researchers and students, which will provide them access to state-of-the-art CAD design tools for non-commercial (educational and research) use.

Ecosystem Development Activities

FABrIC will grow the semiconductor ecosystem in Canada and leverage the skills and resources of the entire value chain by:

- Creating awareness and actively recruiting membership through a national launch of FABrIC, leveraging CMC's and partner networks to expand the reach of FABrIC across Canada, and through actively engaging through social media.
- Hosting workshops, webinars, town hall meetings, matchmaking and pitch events, other related events, publishing monthly newsletters and other related communications.
- Posting calls at least annually for Challenge projects for semiconductor fabrication and IoT product development to stimulate the development and growth of companies and academics within the Canadian semiconductor value chain, incentivize and foster collaboration and partnering within the ecosystem, and stimulate the creation and sharing of Canadian IP with members of the ecosystem, as appropriate.
- Hosting of the annual 'Canadian Semiconductor Summit' and related workshops which will foster collaboration and alignment on sector priorities. Participants include manufacturing companies, product design and development companies, NFPs, sector end-users, academics, students and researchers, industrial associations, global supply chain partners, suppliers, and government agencies. The Summit and related workshops will also bring together Canadian semiconductor advocacy groups (i.e., CMC, CCL, Canada's Semiconductor Council (CSC), Council of Canadian Innovators (CCI), SILICAN, Alliance of Semiconductor Innovation Canada (ASIC)) to gain alignment and synergy on actions around collaborative projects, attracting investment, advocacy, policy development and planning.
- Hosting multi-sectoral outreach activities to ensure FABrIC activities are aligned with the needs of sectors of national economic strategic priority including clean energy, agriculture, electrification of vehicles, 5/6G data communications, manufacturing, healthcare, mining, etc.
- Developing and implementing ecosystem and partnering infrastructure including the FABrIC website, member registration and directory, network member portal, secure access to IP and resources, etc.

Target semiconductor ecosystem participants:

- **350** SMEs, large organizations and MNEs
- **10-15** semiconductor and/or advanced sensor/semiconductor fabrication organizations
- **70** post-secondary institutions (1,000 professors and 15,000 students)
- **15-20** not-for-profits (NFPs)
- **~3-5** government agencies (e.g., National Research Council Canada, Defence Research Development Canada, etc.)

Participating organizations are expected to become ecosystem development partners by contributing significantly to furthering the objectives of FABrIC, e.g., by providing support that helps sustain aspects of

the ecosystem in the long-term, by making technology capability widely accessible for the benefit of ecosystem users, etc.

Target pan-Canadian industry participation is based on estimates of the demographics in the sector:

- 35% Ontario
- 30% Quebec
- 20% British Columbia
- 10% Alberta
- 5% from the other provinces and territories

Network Innovation Priorities

Network innovation priorities will be established by the FABrIC Advisory Committee (FAC) and will be aligned with the overall goals and objectives of the FABrIC project. The FAC is an independent body comprised of a diverse group of sector experts from industry, NFPs, and academia who represent the Canadian semiconductor ecosystem. The FAC will establish and chair specific Challenge Committees which will be comprised of sector experts with expertise in specific Challenge areas (eg. MEMS, photonics, quantum, superconductors, IoT). The FAC will establish priorities by engaging with the broader ecosystem community, as well as reviewing and establishing relevant technology roadmaps, industry trends, and market analyses. This work will inform the FAC who will then recommend themes for FABrIC Challenges Projects and activities within the Innovation Platform. The FAC will work collaboratively to provide strategic direction for the ecosystem and to encourage partnership development and collaboration through the challenge projects. The FAC will make recommendations for approval and funding of Challenge projects and Innovation Platform activities based on the Eligible Project Selection Criteria, network priorities, and FABrIC overall goals and objectives. The FAC will also monitor overall progress of the FABrIC ecosystem in fulfilling the objectives and achieving the outcomes of the FABrIC project and will make any other recommendations to enhance the positive impact of FABrIC for Canada. The FAC reports to CMC Board of Directors.

Challenge Projects

FABrIC Semiconductor Fabrication Process Challenges

FABrIC will issue calls for Semiconductor Fabrication Process Challenge Projects which will support organizations to develop and install new specialized processes for rapid prototyping and low to medium volume semiconductor manufacturing in Canada. Key areas of focus include photonics, microelectromechanical systems (MEMS), compound semiconductors, and quantum/superconducting devices, including related test and advanced packaging technology. At least one challenge call will be issued annually in each of the four core technology areas, with total target funding of \$32M. These challenges are expected to leverage and expand existing Canadian fabrication capabilities and infrastructure in industry (SMEs, MNEs and NFPs) as well as in academia (university labs etc.). This creates and grows critical supply chains for the development and manufacturing of new and innovative products in Canada. Support activities to develop design tools and methods, etc. to enable the rapid adoption of these technologies by the ecosystem will also be funded. Challenge recipients will be required to provide broad and favourable access to these fabrication processes to the Canadian ecosystem. Challenges and ecosystem activities will also foster collaboration between fabrication partners to create a more coherent and aligned supply chain to support and accelerate product development in Canada.

FABrIC IoT Product Development Challenges

FABrIC will issue calls for IoT Product Development Challenge projects which will provide funding and fabrication access support to Canadian companies and academics for the design, development and commercialization of novel advanced sensors and other semiconductor products in Canada targeted at the rapidly growing and strategically important internet of things (IoT) market. These challenges will stimulate and accelerate product development activities in Canada and will increase Canadian semiconductor content in applications in clean tech, electrified vehicles, 5/6G datacom, healthcare, agriculture/agri-food, advanced manufacturing, mining, and other strategically important sectors in Canada. The Challenge calls will also foster the use of Canadian fabrication supply chain partners and new fabrication capabilities developed with FABrIC support where possible. Multiple challenge calls will be issued annually with a total target funding of \$34M.

FABrIC Innovation Platform

The Innovation Platform has been developed to provide a sustainable pipeline of highly qualified personnel (HQP) for the sector in Canada, to support the development of internationally competitive research in semiconductor technologies and devices, to accelerate Canada's readiness for the adoption of quantum computing applications and to support the development and sharing of resources and IP within the ecosystem to accelerate new product development and technology adoption.

The Innovation Platform has four core activities.

- 1) **HQP Development:** Create a sustainable pipeline of HQP with critical skills required for product development and manufacturing roles in Canadian semiconductor companies, helping to address the growing global shortage of skilled resources in the sector by:
 - i. **Fabrication:** providing training, engineering support and affordable access to advanced semiconductor fabrication services (both Canadian and international semiconductor fabrication services) for prototyping devices for academics, researchers, undergraduate and graduate students in Canada.
 - ii. **CAD:** providing training and affordable access to state-of-the-art semiconductor design tools and methods to academics, researchers, undergraduate and graduate students in Canada.
 - iii. **Basecamp training:** running intensive courses in core technologies including full cycle product development; design/prototype fabrication/test for academics, researchers, undergraduate and graduate students in Canada.
 - iv. **Workshops:** Developing and delivering technical workshops and webinars related to semiconductor technologies, product and process development methods.
- 2) **Upskilling and re-skilling HQP** in STEM and non-STEM disciplines by developing and delivering technical training courses, ranging from introductory courses to in-depth courses that will focus on reskilling computer scientists, chemists, biologists and other STEM and non-STEM disciplines to be able to leverage advanced semiconductor technologies and services in their field of work.
- 3) **Accelerate the development of quantum-ready companies** and quantum computing applications in Canada by providing affordable access to Canadian quantum computing infrastructure and technical assistance to small/medium sized enterprises and academics for quantum-based algorithm development and prototyping.

- 4) **Accelerate new semiconductor product research, development, and commercialization** by developing leave-behind technical reference designs, design tools and methods and other resources (including the creation of related IP) for use by the ecosystem, creating and managing a catalogue of IP and other resources created by ecosystem participants in FABrIC activities.

Total funding for Innovation Platform activities is targeted at \$34 million.

Collaboration with Global Innovation Clusters (GICs)

FABrIC will collaborate with Canada's Global Innovation Clusters and other partners by:

- Meeting regularly with members of GICs and other partners to share project activities and outcomes and to proactively seek opportunities for collaboration and alignment of project calls.
- Engaging in joint communications initiatives that promote SIF funded programs across Canada and Internationally.
- Promoting GIC and other partner activities and outcomes in international symposiums and other forums.
- Collaborating on the development and delivery of training, workshops and other joint education initiatives to develop HQP in the semiconductor and related sectors.
- Creating and seeking opportunities for joint calls for project proposals, particularly where these opportunities are aligned with the end user sector priorities, advanced manufacturing, and quantum technologies.
- Promoting other GIC project calls and proactively sharing FABrIC project calls with other GICs.
- Collaborating on match-making activities and referring of members to other cluster members to foster partnering opportunities.
- Subcontracting FABrIC ecosystem opportunities in areas where other clusters have developed existing relevant capabilities.
- Inviting members of other clusters to participate in broader industry panels, webinars, etc.
- Collaborating to provide members with shared access to infrastructure, e.g., lab facilities, etc.
- Collaborating on joint advocacy initiatives including funding, strategic supply chain development, foreign direct investment, etc.
- Collaborative participation in international trade missions.
- Encouraging and enabling co-memberships, cross attendance at events, etc.

Management of Ultimate Recipients (URs)

The FABrIC Project Management Office (PMO), with support from the legal advisor, will be responsible for ensuring that Ultimate Recipients (URs) understand the terms of the UR master project agreements, for monitoring compliance with agreements and for managing the discontinuance of support of non-compliant projects as required. Key activities for managing URs include:

- The PMO will develop template UR master project agreements that are compliant with Innovation, Science and Economic Development Canada (ISED) requirements prior to the launch of the Challenge projects. These will include terms related to project audits, reporting, controls, etc.
- The Challenge Project selection process will require that URs provide evidence that they have the appropriate resources and processes in place to effectively execute their proposed projects according to the terms of the master project agreement. This includes appropriate governance, Equity, Diversity, and Inclusion (EDI), conflict of interest, financial controls, confidentiality and IP controls, cybersecurity controls, and reporting policies and processes.

- The PMO will negotiate and execute contribution agreements with the URs and will interact with and monitor the URs at regular intervals throughout the term of the Challenge project. URs will be required to provide project status reports at regular intervals, including post-project reporting of key performance indicators (KPIs), etc. The PMO will review status, provide feedback and, if necessary, may audit the project with the URs and/or take appropriate proactive corrective actions to ensure the URs are both compliant with their contribution agreement and successful in the execution of their project.

Key Performance Indicators

Key Performance Indicator	Target
Number of calls for proposals launched ✓ Fabrication Activity: 20 ✓ IoT Activity: 5	25
Number of Ultimate Recipient agreements signed ✓ Fabrication Activity: 15 ✓ IoT Activity: 60	75
Number of eligible projects funded ✓ Fabrication Activity: 15 ✓ IoT Activity: 50	65
Percentage of Ultimate Recipient projects with two or more organization types receiving ISED-SIF flow through funding to collaborate on a project. <i>Organizational types include for-profit, not-for-profit, educational institution, partnership, sole proprietorship, Indigenous organization, etc.</i>	5%
Number of new or significantly improved products, processes, or services developed ✓ Fabrication Activity – MEMS: 5 ✓ Fabrication Activity – Photonics: 5 ✓ Fabrication Activity – Quantum: 5 ✓ Fabrication Activity – Compound Semiconductor: 5 ✓ IoT Activity: 60 ✓ Innovation Platform: 670	750
Number of fabrication runs available to the ecosystem * (see below)	36
Number of products, processes or services commercialized	85
Number of new intellectual property (IP) applications developed ✓ Challenge Activities: 25 ✓ Innovation Platform: 190	215

Key Performance Indicator, continued	Target
Number of Full-time Equivalents (FTE) created	325
Number of Full-time Equivalents (FTE) maintained	440
Number of events, including: ✓ Knowledge transfer events and/or advisory services organized by the Network to support ultimate recipients. <i>These events can include advisory services, training events, symposia, conferences, workshops, field days, and webinars.</i> ✓ Showcase events organized by the Network to support ultimate recipients to generate investments. <i>These events can include showcase events, demonstration days, and pitch days.</i>	120
Number of HQP trained in academia	25,000
Number of intensive CMC Basecamp training courses	25
Number of upskilling/reskilling workforce courses	30
Number of participants at upskilling/reskilling workforce courses	1,000
Number of community leave behind resources ✓ Reference Designs: 40 ✓ PDKs, Design Guides: 50	90
Number of unpaid network members	2,000
Number of paid network members	900
Talent for innovation–HQP moved into industry in Canada (not incl. undergrads)	4,000
Academic prototyping projects to develop skills and advance industrial R&D projects (through the Innovation platform) (<i>lower TRLs</i>)	1,500
New companies launched	75
Active academic collaborations with Canadian companies	2,000

Secure and Traceable Access to Data for Canadians

Comprehensive stewardship of data within FABrIC will be achieved by an integrated management system which will ensure privacy and security controls are effectively implemented. The data management goals are to ensure data accuracy, privacy, security, consistency, traceability, and accessibility for all critical data across multiple systems and processes used to deliver the FABrIC project to the ecosystem. Key elements include stringent data governance policies to regulate data access and usage for ensuring compliance with data protection regulations and security protection standards.

It is crucial to ensure that data is shared securely to avoid any potential data breaches or data misuse. Key elements of the plan for sharing data include:

- **Classify the data:** Building from CMC's data classification and protection program, shared business data will be identified and classified to determine the type of data that needs to be shared with the partner. **Define the sharing agreement:** Create a formal agreement that outlines the terms and conditions of the data sharing, including the purpose of the sharing, the duration of the sharing, the access rights of the partner, and the security measures that will be taken to protect the data.
- **Define sharing protocols:** Determine requirements for multiple partner sharing protocols. **Establish secure communication channels:** Uses a zero trust architecture to transfer the data securely to the partner.
- **Implement access controls:** Limit the partner's access to only the necessary data. Use multi-factor authentication, role-based access controls, and security mechanisms to ensure that the data is accessed only by authorized personnel.
- **Monitor and track data access:** Monitoring tools will be used to track data access and detect any suspicious activity. This will help to identify any potential breaches early on and take immediate action. Each significant data asset will require attached specific meta-data which includes asset handling audit trailing.
- **Conduct regular audits:** Regular audits of the data sharing process will ensure that the security measures are working effectively and will identify any potential vulnerabilities and required corrective action.
- **Terminate access when necessary:** Terminate the partner's access to the data when the sharing agreement expires or when the partner no longer needs the data.
- **Determine data disposal:** Manage sharing agreement actions for data retention, backup, and disposal.

The **FABrIC Data Strategy** document describes the approach in more detail.

FABrIC Portal and Website

FABrIC will maintain a website < www.FABrICInnovation.ca > for sharing information regarding the project. The domain is registered and managed by CMC. At a minimum, the site will include standard content to describe the goals and objectives of FABrIC, key process guidelines and network strategy documents, policies and procedures, membership information, public reports regarding the projects, upcoming and current Challenge project calls, upcoming events and other ecosystem activities, announcements of supported projects, impact stories and news articles showcasing the ecosystem. The website will also have a secure members client portal for personalized membership information, submission of applications for Challenge projects, partnering and matchmaking information, access to tools, knowledge bases, training resources, IP resources and other resources for the ecosystem. CMC will leverage established processes and workflows used on their existing website < www.CMC.ca > to deliver secure access to proprietary tools and technologies. The website will be designed in accordance with accessibility best practices and all content will be available in both official languages. A webpage < www.CMC.ca/FABrIC > will be maintained on CMC's existing website to provide an overview of FABrIC and links to the FABrIC website: www.FABrICInnovation.ca

Equity, Diversity, and Inclusivity (EDI)

The FABrIC project is powered by and managed by CMC. CMC is unwavering in its commitment to the principles of Equity, Diversity, and Inclusion (EDI). We believe that fostering an inclusive environment enhances innovation, creativity, and excellence. We recognize that a breadth of perspectives, skills, and experiences contribute to excellence in research and innovation. This culture is the responsibility of every participant in the ecosystem, including employees, funders, investors, sponsors, institutions, companies, researchers, advisors, administrators, and reviewers. As part of our dedication to EDI, CMC is also actively participating in the Government of Canada's 50-30 Challenge, which aims to accelerate gender parity and the inclusion of under-represented groups in leadership roles.

EDI is a cornerstone of our governance and operational practices. FABrIC Challenge, Innovation Platform and Ecosystem Development proposals that advance EDI principles are given additional assessment points, reflecting our commitment to creating a diverse and inclusive community. We recognize that embracing EDI is not just a goal, but a continuous journey. By embedding these values into our decision-making and resource allocation processes, we aim to ensure that our investments yield the maximum benefit for all members of our community.



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