

# Evaluation of TRIUMF

NRC-EVALUATION

## Budget (2018-19 to 2021-22)

**TRIUMF Total Revenues:** \$360.6M  
**TRIUMF Total Expenses:** \$360.9M  
**TRIUMF Innovations Total Revenues:** \$3.8M  
**TRIUMF Innovations Total Expenses:** \$6.8M



## Resources (as of March 31, 2022)

**Staff (including graduate students and PDFs):** 549  
**Equity, Diversity and Inclusion (EDI):** annual female undergraduate applications over the evaluation ranged from 26 to 32% and female hires ranged from 22 to 36%.



## About the laboratory

TRIUMF is a multidisciplinary fundamental science research laboratory located in British Columbia (BC) conducting research in particle, accelerator and nuclear physics, nuclear medicine and materials science. Incorporated as a not-for-profit charity, TRIUMF is owned and operated by Canadian member universities and acts as a hub for discovery and collaboration using centralized resources, tools and expertise. TRIUMF attracts scientists from over 40 countries and has over 75 international agreements and memorandums of understanding with 32 institutions across 16 countries.

TRIUMF Innovations (TI), an affiliate that is fully controlled by TRIUMF Inc., is a non-profit corporation that manages, supervises and administers services related to technology commercialization. It is responsible for managing aspects of TRIUMF's business dealings, intellectual property (IP), commercial opportunities and spin-off companies.

TRIUMF received \$232.1 million in operational funding from the National Research Council (NRC) over the evaluation period. The terms and conditions for funding are outlined in 5-year Contribution Agreements signed by both parties.

## About the evaluation

The 2018-19 to 2021-22 evaluation was conducted by the NRC's evaluation team in accordance with the Treasury Board's Policy on Results and *Financial Administration Act*, to assess the impact of public funding. The evaluation assessed TRIUMF's scientific excellence, social and economic impact, relevance, capacity, competency, facilities and governance. A mixed-methods approach included document and data reviews, user survey, internal and external interviews, socio-economic impact assessment, bibliometric study and peer review with international experts.

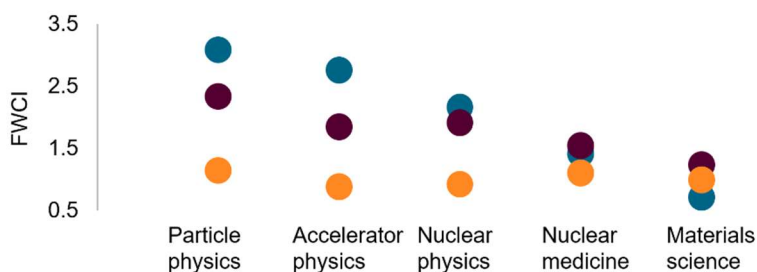
## Key findings

### Scientific excellence

TRIUMF is a **leading national lab for subatomic physics and accelerator science**, and acts as **Canada's gateway to global science and technology collaborations**:

- held **28 leadership roles** in national and international collaborations
- involved in **2,252 international publications** (internal target = 1140)
- participated in **18 international collaborative projects**
- overall FWCI (2.15) is **more than double the world average** (1.0)
- ranked with 10 organizations, TRIUMF FWCI's: **second** in particle and accelerator physics; **third** in nuclear physics

**TRIUMF's FWCI rates are higher than Canada and the world in particle, accelerator and nuclear physics, 2022**



### Social and economic impact

TRIUMF activities and partnerships resulted in positive outcomes, economic benefits and cost savings in Canada.

Public investment in TRIUMF created **direct, indirect and induced economic impacts for Canada**:

- increased Canada's GDP by \$489.7M, or **1.68 times its investment in TRIUMF**
- increased BC's GDP by \$447.5M, or **9.34 times its investment in TRIUMF**
- direct impact from Canadian expenditures (**TRIUMF: \$336.4M; TI: \$6.8M**)

TRIUMF contributes to healthcare improvement and provides **Canada cost savings on isotopes and technology for medical imaging** through the in-Canada production of high-demand medical isotopes.

TRIUMF's undergraduate co-operative and summer student programs provided hands-on experience in core research areas, cyclotron operation, medical physics, radiochemistry, engineering and computing:

- hosted **135 undergraduate students** in 2021-22 (12% increase from 2018-19)
- hosted **65 post-doctoral fellows** in 2021-22 (23% increase from 2018-19)

## Relevance

TRIUMF keeps a **pulse on global scientific and technological needs** and its staff participate in strategic planning for the international physics community. TRIUMF aligns itself well with key activities and research undertaken by Canadian member universities. Heavy investment in IAMI and ARIEL demonstrate long-term alignment with the physics, life sciences and nuclear science communities. These facilities will have **unique capabilities to address emerging and future needs** of TRIUMF-related international scientific communities.

To expand its presence outside of BC, TRIUMF increased its social media activities and developed a multimedia website to provide information, videos, animations, infographics and virtual tours of the lab.

## Capacity, competencies and facilities

TRIUMF's **international reputation for high profile science, unique technology and hands-on mentorship** are key to attracting qualified national and international candidates. Staff retention issues and recent turnover have contributed to the need for resource prioritization. TRIUMF is working on alternative strategies for retention and exploring future succession planning.

TRIUMF introduced an EDI Officer and policy, harassment policy and staff training, and a directive to include gender diversity on hiring committees. However, TRIUMF focus on diversity outside of gender is lacking.

TRIUMF facilities meet research community needs, provide **sought-after technology that does not exist elsewhere** and contribute to **training, education and research** in related scientific fields. Some infrastructure is aging and needs refurbishment and many beam lines are oversubscribed. However, access to TRIUMF facilities is considered to be fair and transparent.

### TRIUMF facilities oversubscribed or at capacity, 2018-19 and 2021-22

Facilities*		2018-19	2021-22
SAP-RIB	ratio >1.0 = oversubscription	1.73	1.27
MMS-μSR		1.29	1.49
MMS-βNMR		1.94	1.57
Machine shop	% rate = billable hours / FTE	106%	100%
Design office		104%	105%

\*not an exhaustive list of facilities

## Recommendations

1. The NRC should encourage TRIUMF to advance roles and responsibilities associated with the TRIUMF BoG and its committees, the Science Council and TRIUMF Innovations Board of Directors to enhance efficiency and effectiveness.
2. The NRC should work with TRIUMF to advance TRIUMF's business processes and reporting tools as part of its commitment to operational excellence. Adjustments should align with resources and program requirements.
3. The NRC should invite TRIUMF to formalize an overarching HR Plan to deliver future key areas of strategic focus and embed practices into TRIUMF's culture. The plan should include a formal retention plan, a formal succession plan and a broadened EDI strategy with metrics that incorporate the many dimensions of diversity.
4. The NRC should encourage TRIUMF to develop risk-based tools and processes for project prioritization and resource management.

## Governance

TRIUMF hired a new Executive Director and CEO in May 2021 and reorganized into new divisions. It transitioned to an incorporated non-profit charity and appointed a skills-based Board of Governors (BoG) to provide **greater efficiency, decision-making and clarity of responsibilities** for TRIUMF and its governance. There is ongoing work to clarify the roles and responsibilities of the Members' and Science Councils and BoG committees.

Governance changes brought TI closer to lab operations, **encouraging tighter alignment** between research activities and commercial activities and providing opportunities to bring knowledge and technologies to market. A new Business Development Plan helps ensure expansion of new commercialization opportunities and formalizes IP strategies.

TRIUMF's financial reporting requirements and internal committee, BoG and Council meetings and reports have increased in frequency, volume and scope. Alignment and harmonization can enable conversations around responsibility and role advancement.

TRIUMF improved its project management processes, administration system and framework to monitor project commitments and is working on introducing new standards and tools into work processes.



TRIUMF improved its communication practices, including a toolkit, monthly virtual town halls and newsletters, director updates, site-wide announcements, divisional meetings and weekly senior management meetings.

The full evaluation report, including management response and action plan, is available on the NRC's website: <https://nrc.canada.ca/en/corporate/planning-reporting/evaluation>