



Welcome and Introduction to TRIUMF

International Conference on Ion Sources 2023

Nigel Smith
Executive Director and CEO TRIUMF

Monday, September 18, 2023



Welcome to ICIS'23

International Conference on Ion Sources

September 17-22, 2023

Victoria Conference Centre

Hosted by:



With thanks to our sponsors:



Welcome to B.C.!

Home of TRIUMF

TRIUMF is Canada's particle accelerator centre. We are a world-class hub of research, education, and innovation that is home to ~600 staff and students

Founded in 1968 by the University of British Columbia, Simon Fraser University, and the University of Victoria, TRIUMF is a cornerstone of BC's innovation ecosystem, driving impact locally, nationally, and around the world



TRIUMF is located on the traditional, ancestral, and unceded territory of the Musqueam people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

TRIUMF's home has always been a seat of learning.



Our **Vision** is for
Canada to lead in
science, discovery,
and innovation,
improving lives
and building a
better world





Our **Mission** is to serve as Canada's particle accelerator centre

We advance isotope science and technology, both fundamental and applied

We collaborate across communities and disciplines, from nuclear and particle physics to the life and materials sciences

We discover and innovate, inspire and educate, creating knowledge and opportunity for all

Discovery, accelerated.

Our multidisciplinary community uses TRIUMF's world-class accelerator infrastructure to drive leading-edge research that delivers impact in **science, medicine, and industry, helping position Canada as a global leader**

Member Universities:

University of Alberta
University of British Columbia
University of Calgary
Carleton University
University of Guelph
University of Manitoba
McGill University
McMaster University
Université de Montréal
University of Northern
British Columbia

Queen's University
University of Regina
Saint Mary's University
Université de Sherbrooke
Simon Fraser University
University of Toronto
University of Victoria
University of Waterloo
Western University
University of Winnipeg
York University



What does TRIUMF do?

TRIUMF's work spans the entire continuum of research from fundamental science to commercialisation

TRIUMF has cultivated a hub of excellence around a core of expertise in accelerators and isotope research

From supporting Nobel-winning research to delivering life-saving breakthroughs in health and technology, TRIUMF is a major asset in Canada's high-tech landscape



Scale of Operations

HIGHLY QUALIFIED PERSONNEL

>500 staff¹

>200 students & post-doctoral researchers²



1000+ scientist & researcher visits per year



KNOWLEDGE

~80% of Canada's subatomic physics research involves TRIUMF



INTERNATIONAL ENGAGEMENT

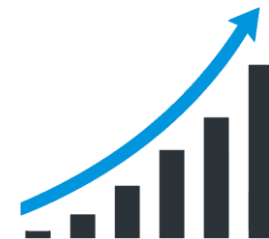
75+ international agreements & partnerships

China Italy Switzerland
Israel USA Korea France
Russia India Japan
United Kingdom Austria Germany



BUSINESS

\$1.1B in gross economic output since 2012, and >\$600M in GDP attributable to TRIUMF over this period



1 – Total across funding sources

2 – Includes external students and post-docs



A global leader in discovery science, delivering breakthroughs that unlock the deepest mysteries of the universe

Strengthening Canada's leadership in groundbreaking particle and nuclear physics



A world-class accelerator centre driving use-inspired research – from the life sciences to quantum and green technologies

Leveraging our unique infrastructure to pursue research in Canada that will change the world



An inclusive multidisciplinary talent incubator, attracting and developing the best people from around the world

Producing Canada's future science leaders and innovators



A leader in a flourishing national Big Science ecosystem

Catalyzing the success and growth of Canada's network of major research facilities



A national innovation hub translating discovery science into health and sustainability solutions

Responding nimbly to complex societal challenges for the benefit of Canadians

20-year vision for TRIUMF

- TRIUMF released 20-year vision released in September 2022 as a response to previous PRC recommendation
- An 18-month process engaging a broad research and stakeholder community, leading to five core themes
- All previous work leading to the Vision is available on the [TRIUMF web site](#)
 - Includes input from focus groups, interim pillars and themes, and theme development



TRIUMF accelerator complex

Primary beam driver (1974):

500 MeV Cyclotron, 300 μ A, H⁻

Produces rare isotopes, neutrons and muons

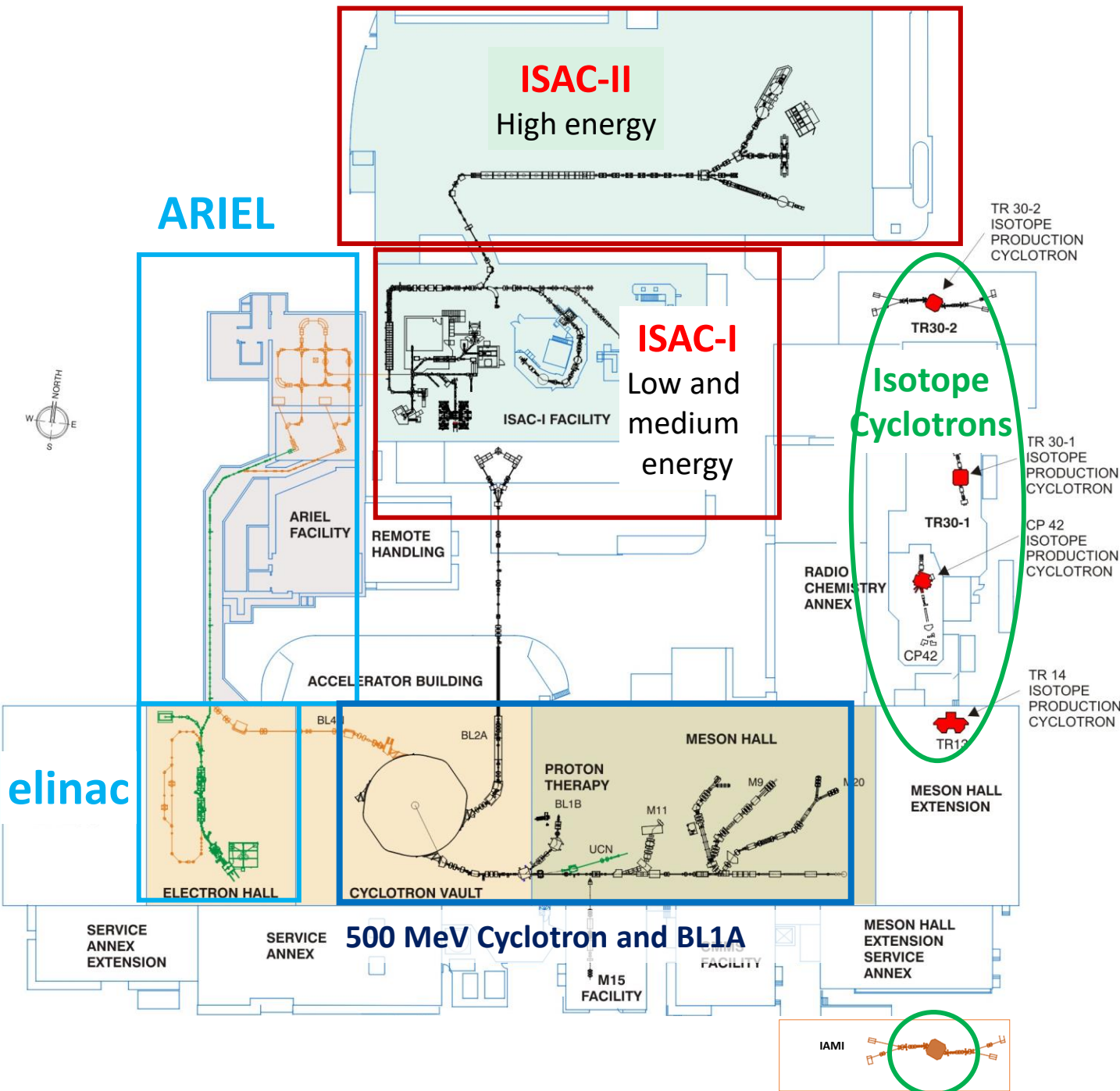
Isotope Separator and Accelerator facility – ISAC (1996)

- ISAC-I: Normal conducting-linac
 - 0.15-1.8 MeV/u (2000)
- ISAC-II: Superconducting-linac
 - 1.5-16.5 MeV/u (2006)

Advanced Rare Isotope Laboratory – ARIEL (in progress)

- Superconducting electron linac
 - 30 MeV, 10 mA, cw (2019)

4 (+1) Cyclotrons for medical isotope production – TR30 and TR13 designed by TRIUMF





World's Highest Current
Superconducting Electron
Linear Accelerator for rare
isotope research



World's Largest
Conventional Cyclotron

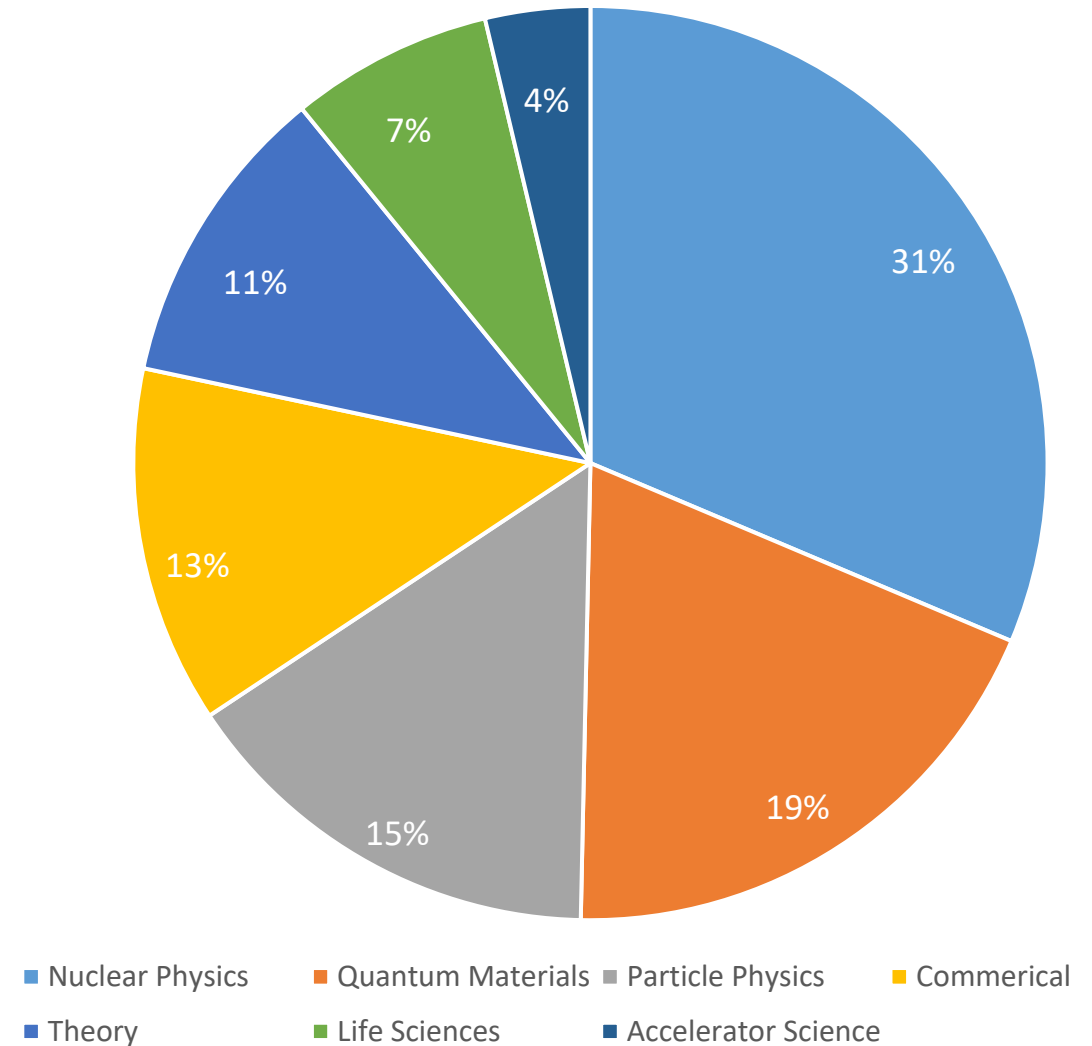


Multidisciplinary

In 2019*, TRIUMF welcomed 1186 scientific users and visitors to the site

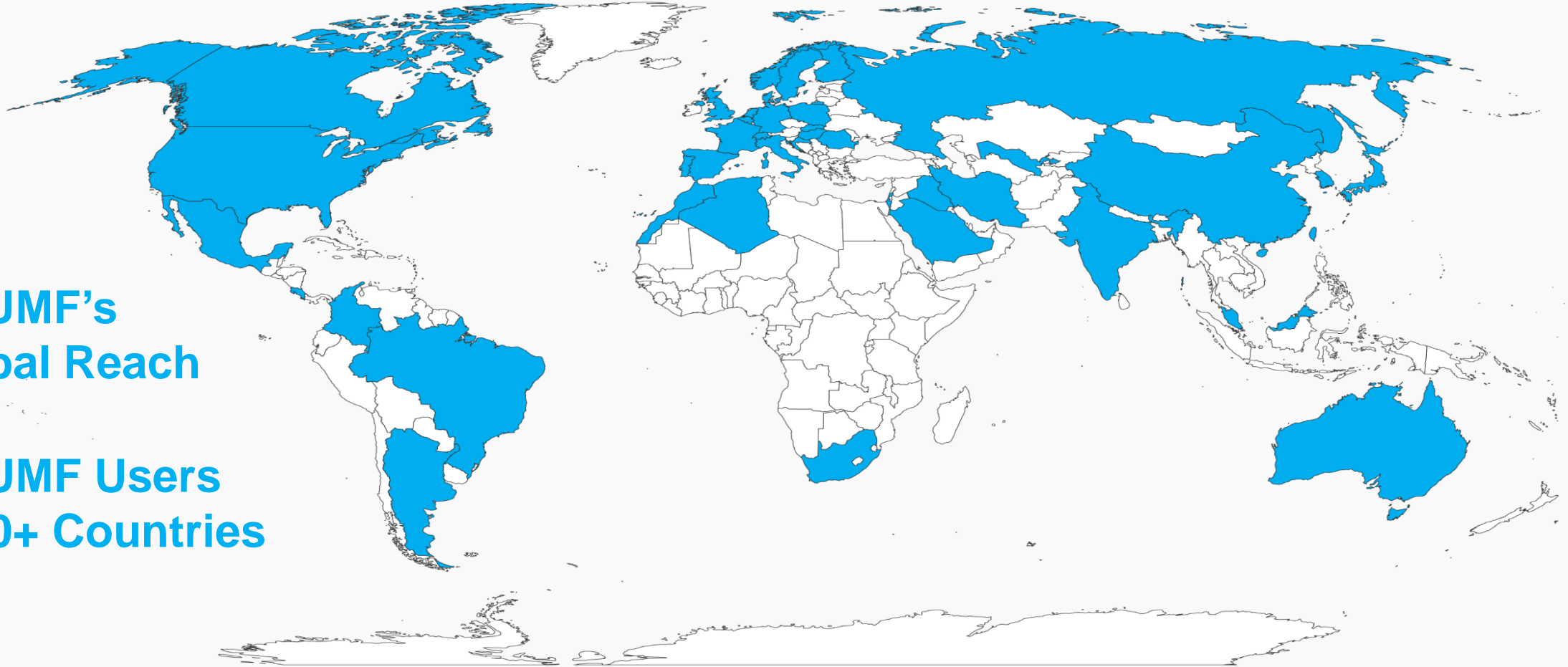
* As the last full year before the outbreak of the COVID-19 pandemic, these values are most representative of TRIUMF's community

Scientific Users and Visitors by Field



**TRIUMF's
Global Reach**

**TRIUMF Users
in 40+ Countries**



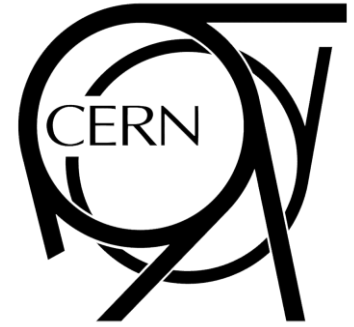
TRIUMF as an international connector

TRIUMF coordinates delivery of Canadian contributions to international laboratories

- Delivering Canada's contribution to CERN high luminosity upgrade of the Large Hadron Collider; KEK in Japan and VECC in India
- Requested by US Brookhaven to provide accelerating cavities to the \$B Electron Ion Collider, the US next generation accelerator
- Contributing to the US Department of Energy nuclear and particle physics decadal strategies for their major investments
- Major coordination role for the \$400M next generation international double-beta decay experiment being attracted to SNOLAB

TRIUMF is a co-funder of International Year of Basic Sciences for Sustainable Development (IYBSSD), one of 3 institutions in Canada (with NSERC and Fonds de recherche du Quebec), and a member of the steering committee.

- Mobilizing scientific community to promote application of basic sciences to sustainable development goals of Agenda 2030



IYBSSD2022

International Year
of Basic Sciences
for Sustainable Development



Innovation and Collaboration

The real-world impact of TRIUMF's reach spans well beyond its expertise in physics, with application in:

- Medicine and drug development
- Materials development and testing
- Accelerator and detector technologies
- Mining and natural resources
- Border security
- Oil and gas exploration
- Data sciences



TRIUMF
INNOVATIONS





Thank You!
Merci!

www.triumf.ca

@TRIUMFLab

