



# Welcome and Introduction

## Nigel Smith, ED&CEO



*NAVIGATING  
NEW HORIZONS*



# Land Acknowledgement

TRIUMF is located on the traditional, ancestral, and unceded territory of the x<sup>w</sup>məθk<sup>w</sup>əy̓əm (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 and knowledge



# Code of Conduct

- All participants, including attendees and organisers will treat each other with respect and conduct themselves in a professional manner that is welcoming to everyone and free from any form of discrimination, harassment, or retaliation.
- Discriminatory, harassing, or bullying behaviour or action of any kind will not be tolerated, and will result in immediate removal from this meeting and ban from all future TRIUMF activities and notification of appropriate authorities, if necessary.
- If you believe that you have been subject to or have witnessed behaviour that violates this code of conduct, please report it immediately to the organisers ([triumfsw@triumf.ca](mailto:triumfsw@triumf.ca)).



# Overview

- Science Week 2023 features 3 main programme foci:
  - **Showcasing** achievements from the past year and reviewing science drivers for our programme, including a day dedicated to the potential that ARIEL will provide
  - **Planning** future directions following the 20-year vision, quinquennial evaluations and discussions on our five-year request for support
  - **Networking** with lots of opportunities for the community, students and postdocs to discuss, network, and engage (and kick a ball around!)
- Science Week provides an opportunity to discuss and provide feedback on our five-year request for support, divisional planning and alignment to the 20-year vision





# Science Programme Overview

- **Monday:** Introduction and science overviews and recent highlights (ACC, LSCI, NP, MMP)
- **Tuesday:** Science overviews and recent highlights (PP, SCITech, SCiComp), EDI Workshop and student talk competition
- **Wednesday:** 5-year request for support, Divisional plans, Sustainability panel and collaborations, poster session
- **Thursday:** ARIEL Day - status and science opportunities in a new era, career paths and networking opportunities
- **Friday:** TUG meeting and early career workshop; ARIEL tour



# Networking and Social Events Overview

- **Monday:** Welcome reception
- **Tuesday:** “Science pitch” student talk competition; Five-a-side football finals
- **Wednesday:** Poster session
- **Thursday:** Networking event and BBQ at UBC Farms + volleyball tournament++
- **Friday:** TUG meeting, ECR workshop





280 participants (115 students, 147 staff and faculty & 18 virtually)\*



NAVIGATING  
NEW HORIZONS

Chris Chambers  
Christian Diget  
Kenji Kojima  
Bob Laxdal  
Annika Lennarz

Chloe Malbrunot  
Stephan Malbrunot-Ettenauer  
Iain McKenzie  
David Morrissey  
Petr Navratil

Kate Pachal  
Marcello Pavan  
Thomas Planche  
Stephanie Rädcl  
Allayne McGowan

Paul Schaffer  
Max Swiatlowski  
Hua Yang

\*19% up on last year



# **TRIUMF Annual Overview**

# TRIUMF continues to deliver major progress on many fronts...

- Major progress on science programmes, infrastructure and platforms, including substantial progress on IAMI and ARIEL, domestic and international science projects
- Substantial engagement of TRIUMF in international community planning (esp. DOE NP and the Electron Ion Collider and neutrino-less double-beta decay programmes)
- Substantial workload from our quinquennial evaluation review by the NRC Office of Audit and Evaluation. Completion of the review by the NRC international Peer Review Committee over several days, including engagement across the entire laboratory
- Continued positive evolution of our governance structure, and development of governance and oversight processes (Board, Members, NRC, ACOT, ...)
- Increased occupancy of TRIUMF and interactions between team members, as COVID protocols relaxed sufficiently to allow tours of the facility



# ...yet we have faced some major challenges

- Major pivot to focus on refresh of the Licence Condition Handbook (LCH). Required to ensure LCH reflects current operations fully, without reliance on 'the protocol for development work'
  - Major project for the operations and safety teams including update of primary TRIUMF Safety Analysis Report, and >20 infrastructure documents and safety analysis reports
  - Rework ongoing, but successful to allow restart of driver operations, TR-13 life sciences programme, and TR-30 high current irradiation for medical radioisotope
  - Additional refresh expected in the Fall, to transition to a more risk-based approach to compliance with licence conditions
- Close programme management to optimise use of resources and programme delivery; includes additional resources to ARIEL from TRIUMF reserve and focus on \$25M projects; Recruitment and staff retention challenges continue in several areas as TRIUMF remains somewhat uncompetitive
- Continued discussion with ISED and NRC on the MRF framework for the support of Major Research Facilities in Canada, and the development of a 5-year request for support to government





# Organisational Updates

# TRIUMF Governance Updates

- The amalgamation of TRIUMF Accelerators Inc and TRIUMF INC occurred as planned on July 1st, 2022. This allows TRIUMF INC to assume all liabilities of TAI which was created to hold our CNSC license
- The Joint Venture between the universities, which was the previous ownership and operations model, is in the process of being wound down.
- TRIUMF has increased its member count to 21 Members. The seven new universities that have joined were former Associate Members of the Joint Venture and all have joined the new structure, agreeing to take on liability for TRIUMF
- A call for additional new members (which now includes technical universities) has also launched, and at least 3 additional institutions have expressed interest



# Growing the TRIUMF Network

Seven new Members added in Q4 FY23, bringing total membership to twenty one universities from coast-to-coast.

## 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





# Organisational leadership changes

- CAO Jim Hanlon has “retired” to become a special advisor
- CFO Joanna Carson moving on from TRIUMF in August
  - Shavi Morsara providing additional support
- Juliet Kaggwa and Safia Merali new administrative support
- PSD Director search committee convened in June, and discussion underway on recruitment process and role
- Manuella Vincter (Carleton, particle physics, Chair)
- Sampa Bhadra (York, neutrinos)
- Corina Andreoiu (SFU, nuclear)
- 3x Leadership Team (Kathryn, Bob, Paul)
- 2x TRIUMF BAE (Barry, Sarah)
- GAPS Representative (Chris)

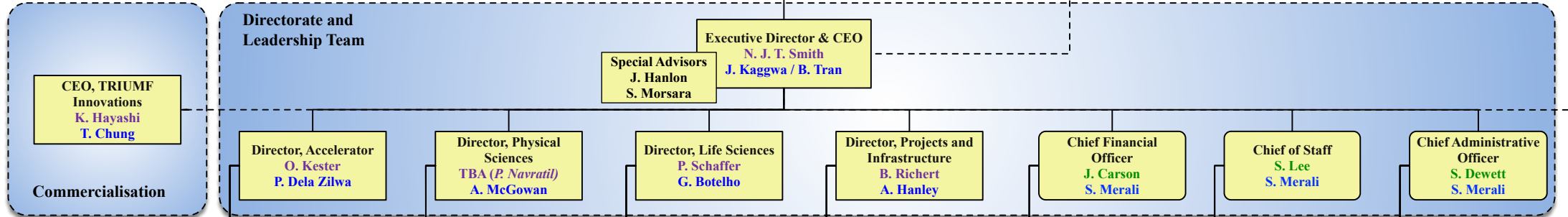
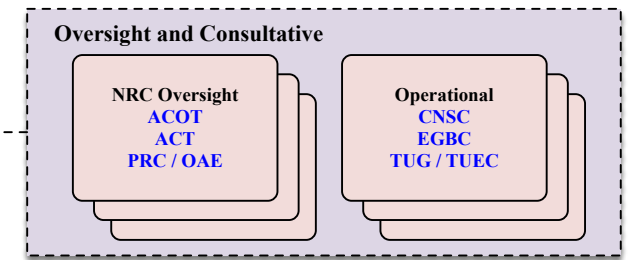
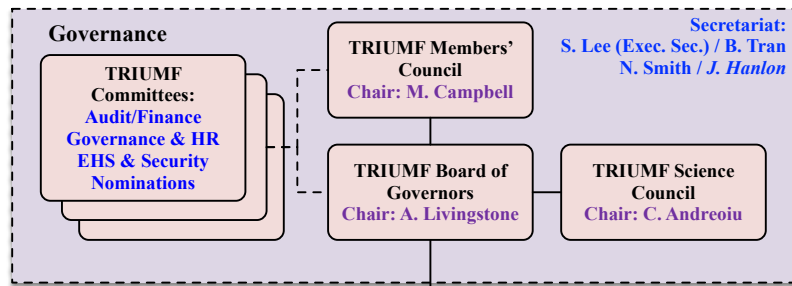


# Chief Administrative Officer - Sanjeev Dewett

- As Chief Administrative Officer (CAO), Sanjeev will lead the modernization of the lab's Core Services Division, ensuring TRIUMF systems and processes continue to support our needs and our community
- Also oversees TRIUMF's compliance with the CNSC and other regulatory bodies
- Sanjeev brings over 20 years of experience in the public sector serving federal, provincial, and local governments, including executive roles responsible for Corporate Services, Intergovernmental & Stakeholder Relations, Compliance, and Chief of Staff to a Deputy Minister



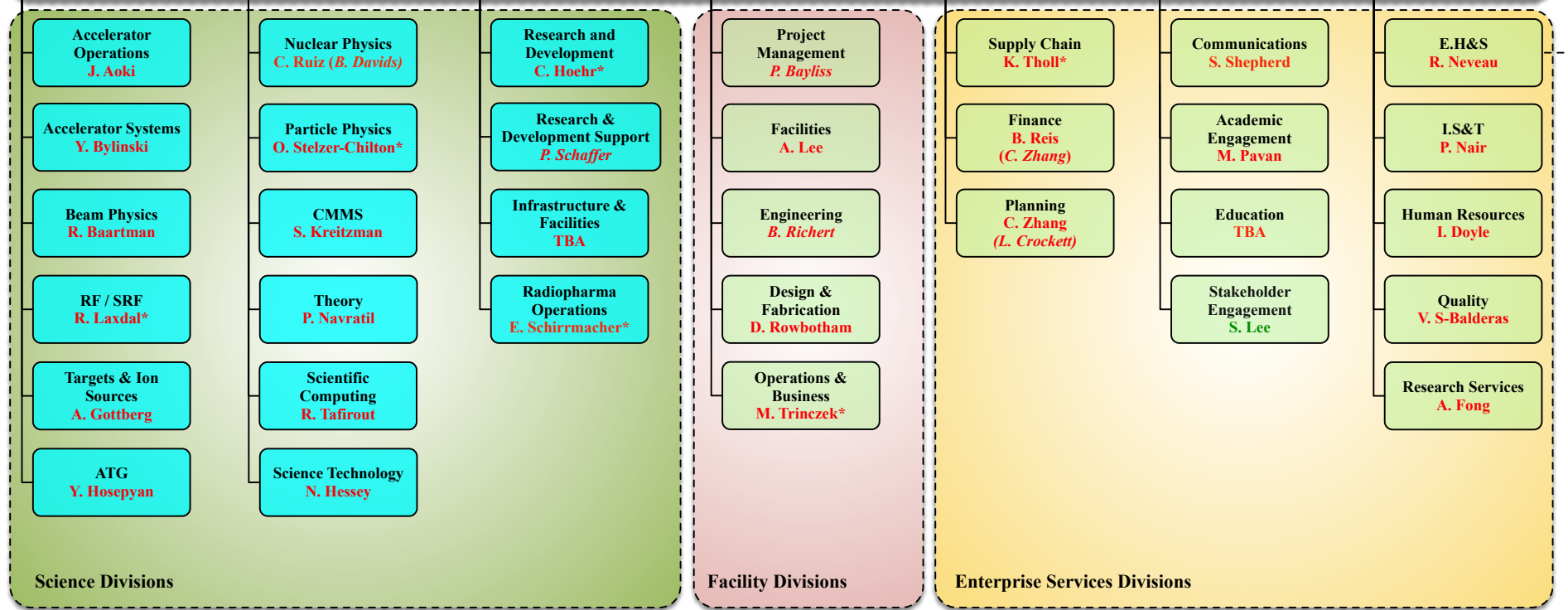
# Organisational Chart



**Additional Responsibilities and Contacts**

Chief Engineer	Bill Richert
Chief Safety Officer	Rock Neveau
Radn. Safety Officer	Rock Neveau
Fire Safety Director	Terry Sanghera (interim)
Research Grants Officer	Petr Navratil
Trade Compliance Off.	Cynthia Reis
EDI Officer	TBA
Ombudsperson	Grace Wong Sneddon
Privacy Officer	Jim Hanlon
Media Contact	Stuart Shepherd
Security Officer	Adrian Lee
BAE Liaison Chair	Barry Davids
P&S Liaison Chair	Doug Preddy
Tech Liaison Chair	Michael Vogel

Joint Health and Safety Committee Members:  
Jon Aoki, Greg Hackman, Aoife Hanley, Evan Hawley, Juergen Kaefer, Danka Krsmanovic, Jens Lassen, Bill Richert, Maxine McKay, Aurelia Laxdal, Pierre St. Louis, Terry Sanghera, Michael Vogel



TBA: to be appointed  
\*Division Deputy



# **NRC Evaluation and Peer Review Committee**

# Peer Review Committee

- Massive effort from many in the lab and community for the PRC visit (and the evaluation more generally, esp. publications review)
- PRC were highly impressed with all presentations, the parallels, posters and the tours - especially enjoyed connecting to the early career teams at TRIUMF
- Many thanks to all who participated (unfortunately their report is not public)



# Peer Review Committee Feedback

- Positive answers to all questions they are being asked
- Really supportive of the science programme, recognising we could do even more if we had additional resources; Very complimentary regarding our science and accelerator programmes, our role in national and international programmes, and how we ‘punch above our weight’
- Areas for improvement exist. Recognise that we are stretched with resources, need to improve our EDI systems, develop our programme management, research security, tell our story more widely, and reduce substantial oversight load from internal and external stakeholders

Theme(s)	Question for PRC
<b>Scientific Excellence</b>	1. To what extent is TRIUMF a platform for scientific excellence, including in its: a. knowledge creation (e.g., scientific publications, technology development) b. connector role (i.e., extent to which Canada's participation in TRIUMF connected Canada to the world in TRIUMF-related fields) c. infrastructure
<b>Relevance</b>	2. Is TRIUMF focusing on the right areas to stay relevant to the TRIUMF community and beyond?
<b>Capabilities</b>	3. To what extent does TRIUMF have the capacity, competencies and facilities needed to achieve its objectives moving forward?
<b>Governance</b>	4. To what extent is the governance of TRIUMF (e.g., committees, policies, and controls) effective / efficient? Are there any efficiencies to be gained? (taking into account the Canadian environment and system)





# Quinquennial evaluation

- The final evaluation report has now been received from NRC, and will be made public later this year.
- Recommendations:
  - 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.
  - 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.
  - 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.
  - The NRC should encourage TRIUMF to develop risk-based tools and processes for project prioritization and resource management.





**20-year Vision Completed**



**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

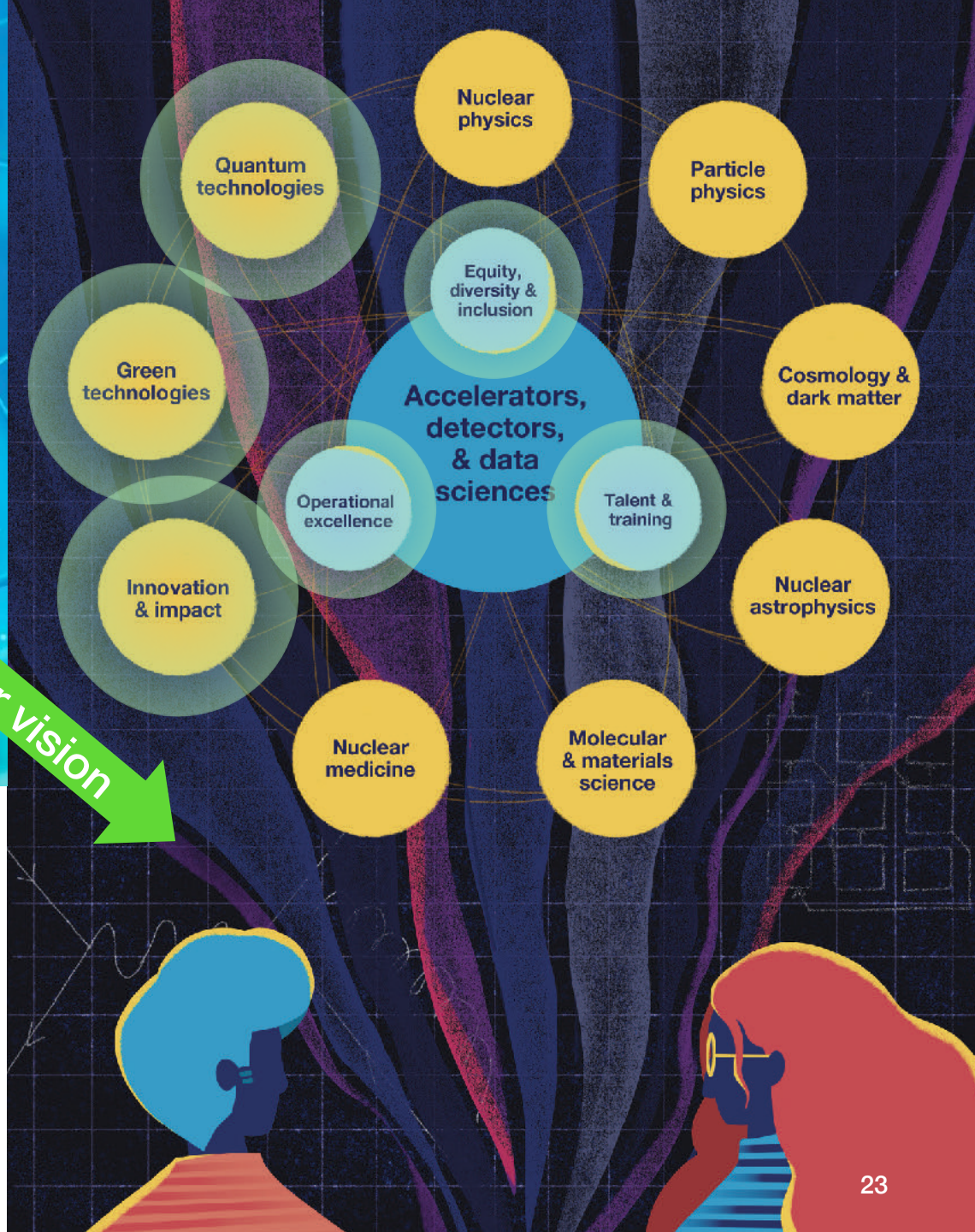
- TRIUMF has now completed a 20-year vision process to define longer term planning requirements (TRIUMF is funded in five-year cycles)
- An 18-month process engaging a broad research and stakeholder community, leading to five core themes
- All previous work leading to the Vision is available on the [TRIUMF web site](#)
  - Includes input from focus groups, interim pillars and themes, and theme development







20 – year vision



- Core themes remain on nuclear / particle physics and life / material science
- Additional themes to be developed around green and quantum technologies
- Innovation and societal benefit called out directly
- Strengthened focus on EDI, our people and operational excellence as enablers

# CNSC Interactions



# Change in Regulatory Landscape

- CNSC have very different regulatory expectations from even a year ago.
  - Noting we received a 10-year licence renewal in July 2022
  - Direction from commission to CNSC staff in license renewal process was to ensure close oversight of TRIUMF and procedures to drive compliance towards N286-12
- Investigation report on operational alignment with our Licence Condition Handbook (LCH) raised 4 NNCs and 8 recommendations
- Significant change in how development work is undertaken
  - TRIUMF has a Protocol for Irradiation of New Materials which allowed development work to be undertaken, assuming 'production' work would then be incorporated into the Licence Condition Handbook
  - CNSC moving to a more formal approach (for the time being) for development work outside the LCH, requiring permission or inclusion.
- This required some systems to be taken off-line until changes to the LCH made





# Restart philosophy

- Updates to the LCH were priority driven, to ensure we restarted science programmes as soon as possible
  - CNSC agreeable to a phased approach. We require formal written approval, ie a memo, but updates to the LCH will be 'batch' driven quarterly.
- For systems already described in the LCH, approach shared with CNSC is to provide updated documentation prior to restarting systems
  - Driver and ISAC operations, and ARIEL commissioning submissions completed during the shutdown
- For systems and parameters outside the LCH envelope, we did not perform work until permission given
  - TR-13 and high current TR-30-2 operational approval granted
  - Current priorities for CNSC are defined as IPF and Th target irradiations;
- Second iteration of the LCH will be needed following this iteration, to shift to a risk-based process-driven approach for development work (ie show TRIUMF processes are solid and safe).
  - Note this is a process that needs embedding in all operations and experimental requests
- Many thanks to everyone who has contributed to this process, a huge amount of work has been completed to advance this issue and get work restarted at TRIUMF





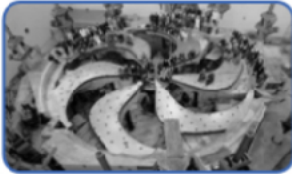
## TR13 Cyclotron

- Approval granted to operate
- Some further SAR updates required by Sep 30<sup>th</sup> before LCH is updated



## ATG TR30 Cyclotrons

- Approval granted to operate TR30-2 at 300 $\mu$ A for Ga-Ni targets
- TRIUMF will submit similar data for TR30-1 for approval



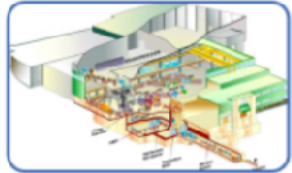
## 520MeV Cyclotron and Beamlines

- TRIUMF "TSAR" : thorough review and update, submitted to CNSC on Apr 24
- Normal operations within LCH limits have resumed



## E-linac

- E-linac/ARIEL SAR updated and submitted Apr 28
- Normal within Class II license limits have resumed



## ISAC

- ISAC-I and ISAC-II SARs submitted in May. Actinide SAR updates planned for June
- Normal ISAC operations have resumed within LCH limits



## IPF

- Combined submission for Thorium irradiations & processing at IPF and BWXT in progress
- Updates to IPF and Thorium SARs, and IPF ventilation commissioning in progress

# EDI Action Plan Release

# Equity, Diversity and Inclusion - Action Plan

- TRIUMF's EDI objectives were completed and released in late 2022; these form the basis around which the EDI Action Plan is based:



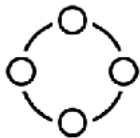
Enhance equity through transparent policies and procedures



Promote and retain diversity through talent attraction and professional development



Foster an inclusive workplace culture through training and community engagement



Establish a framework for truth and reconciliation at TRIUMF

[https://documents.triumf.ca/docushare/dsweb/Get/Document-232809/EDI Action Plan\\_2023-2025.pdf](https://documents.triumf.ca/docushare/dsweb/Get/Document-232809/EDI Action Plan_2023-2025.pdf)





# Equity, Diversity and Inclusion - Action Plan

- Over 3 phases with oversight and timelines which includes:
  - Supervisor and employee training programme
  - Specific mentorship programmes
    - for women and gender non-conforming identities
    - diverse students
  - Release of a site-wide code of conduct
  - EDI workshops and focus groups; surveys to benchmark perceptions on EDI
  - Development and implementation of recruitment practices that are transparent
  - Review of reporting/accountability policies such as Whistleblower, Bullying / Harassment, etc.
- Developing a portfolio of resources and support structures for all employees and visitors



# Equity, Diversity and Inclusion - Action Plan Implementation

- Our EDI Officer (Carla) has returned to school to pursue graphic design - many thanks to her, especially in her role as EDI Officer for establishing the Action Plan
  - Recruitment to this position is in progress
- Accountability and responsibilities for delivery of the Action Plan have been (temporarily) adjusted until EDI Officer in place again
- Timelines in the Action Plan have been shifted somewhat to accommodate expected impact of Carla leaving
- Leadership Team taking responsibility to ensure delivery of actions, on track to new timelines, as communicated through all-hands
- For support, Grace Wong has agreed to act as a temporary resource until mentorship and support programmes are fully in place.
  - Grace is leading the EDI Workshop on Wednesday



# Infrastructure Updates

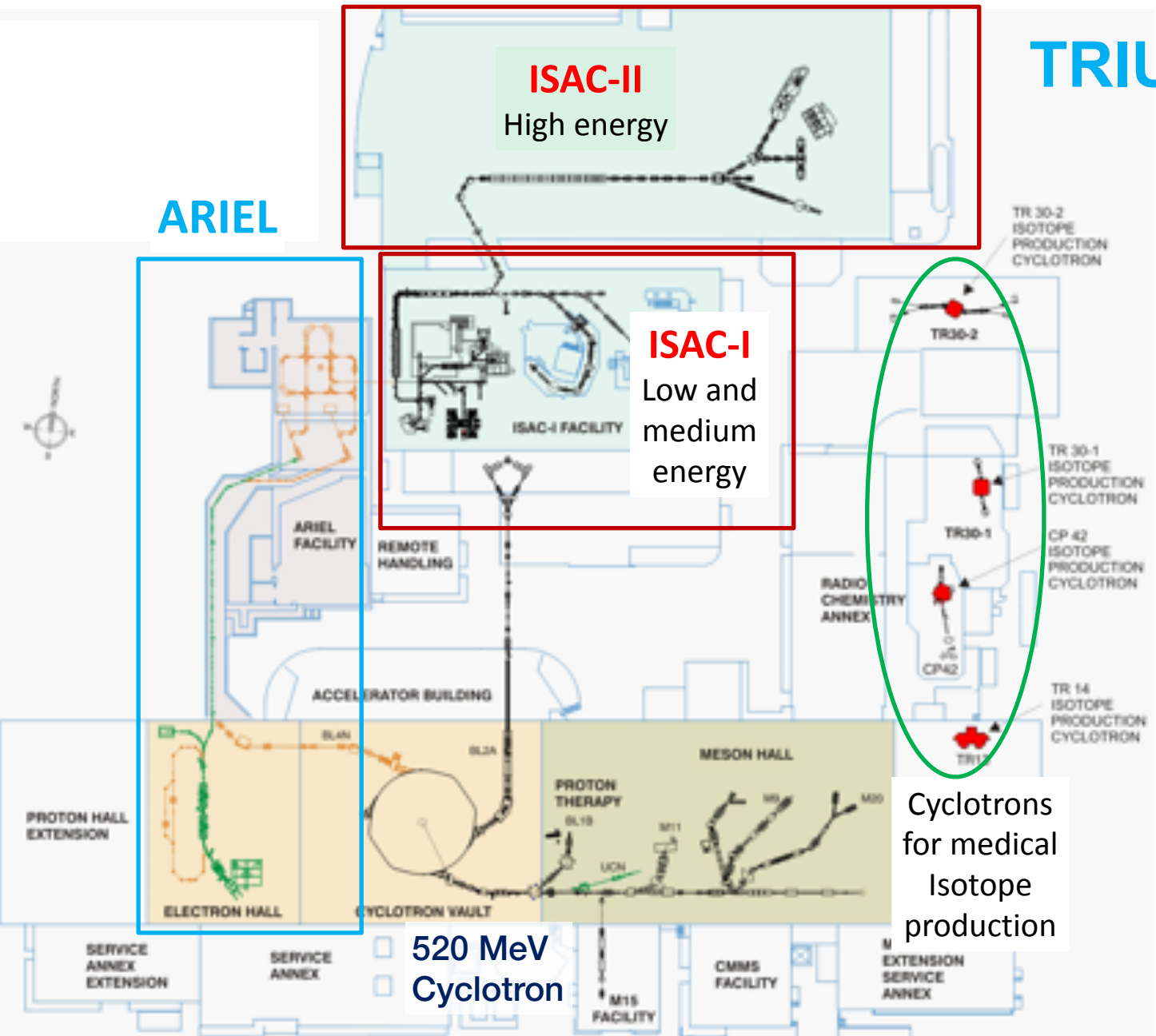
# TRIUMF accelerator complex

**Primary beam driver:**  
Cyclotron, 520 MeV, H<sup>-</sup>  
Produces rare isotopes, neutrons and muons!

**Isotope Separator and Accelerator facility - ISAC**  
Isotope Separator Online (ISOL) facility  
ISAC-I: Normal conducting-linac, 0.15-1.8 MeV/u  
ISAC-II: Superconducting-linac, 1.5-16.5 MeV/u

**Advanced Rare Isotope Laboratory - ARIEL**  
Superconducting electron linac  
30 MeV, 10 mA, cw

4 Cyclotrons for medical isotope production



ARIEL

**ISAC-II**  
High energy

**ISAC-I**  
Low and medium energy

Cyclotrons for medical Isotope production

520 MeV Cyclotron



# 2020-25 NRC KPIs



published scientific papers



highly qualified personnel trained



Canadian scientists & students using TRIUMF



Canadian scientists & students participating in research abroad through TRIUMF



international visiting scientists & students



informal science experiences to the public



commercial revenues

Target	2020/21	2021/22	2022/23	2023/24	2024/25
285 (CY)	317	285	247	PENDING	PENDING
156 (FY)	223	301	275	PENDING	PENDING
206 (CY)	127	90	330	PENDING	PENDING
195 (CY)	224	224	243	PENDING	PENDING
392 (CY)	48	97	294	PENDING	PENDING
15,000 (FY)	8,375	10,327	10,780*	PENDING	PENDING
\$3.0M (FY) (net)	\$5.4M (\$3.3M net)	\$7.6M (\$5.1M net)	\$8.5M (\$4.6M net)	PENDING	PENDING

\*This includes views from TRIUMF's YouTube channel but not views from TRIUMF-supported influencers and visitor videos which totaled over 2.1M in FY22/23

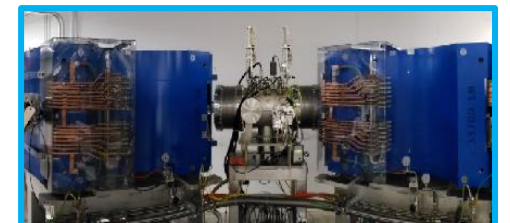
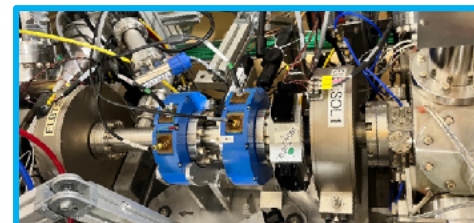
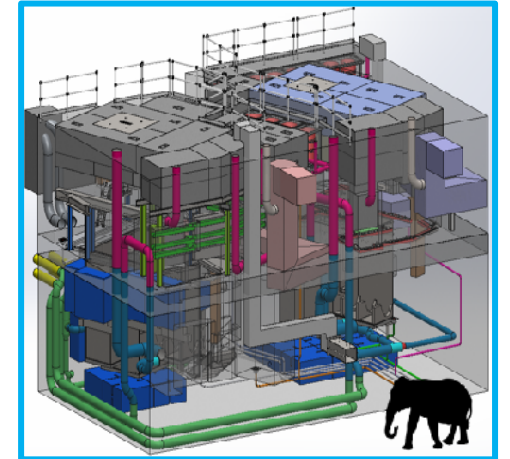
# TRIUMF's Accelerators – ARIEL

## (Some) Achievements in last year:

- Targetry and RIB systems prototype testing completed
- Hot cell completed.
- Proton and electron beam production proven
- Target station shielding construction:
  - Levels 1-7 completed (most complex)
  - Levels 8-9 design completed
  - Levels 10-11 design progressing (simple)
- CANREB EBIS HV improvements successful  
HRS commissioning on track to reach design performance.
- Full cost and schedule evaluation completed. Project is now funded and resourced until completion within the next 5YP

## Planned Dates:

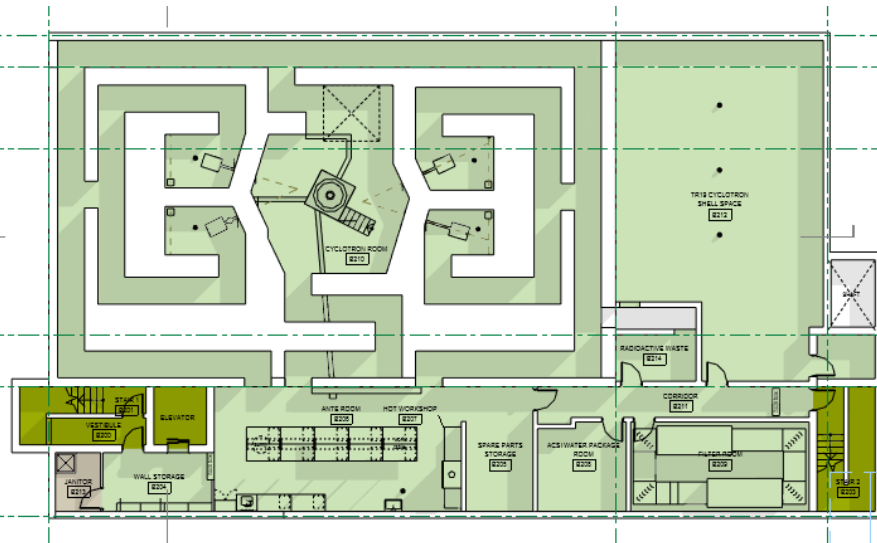
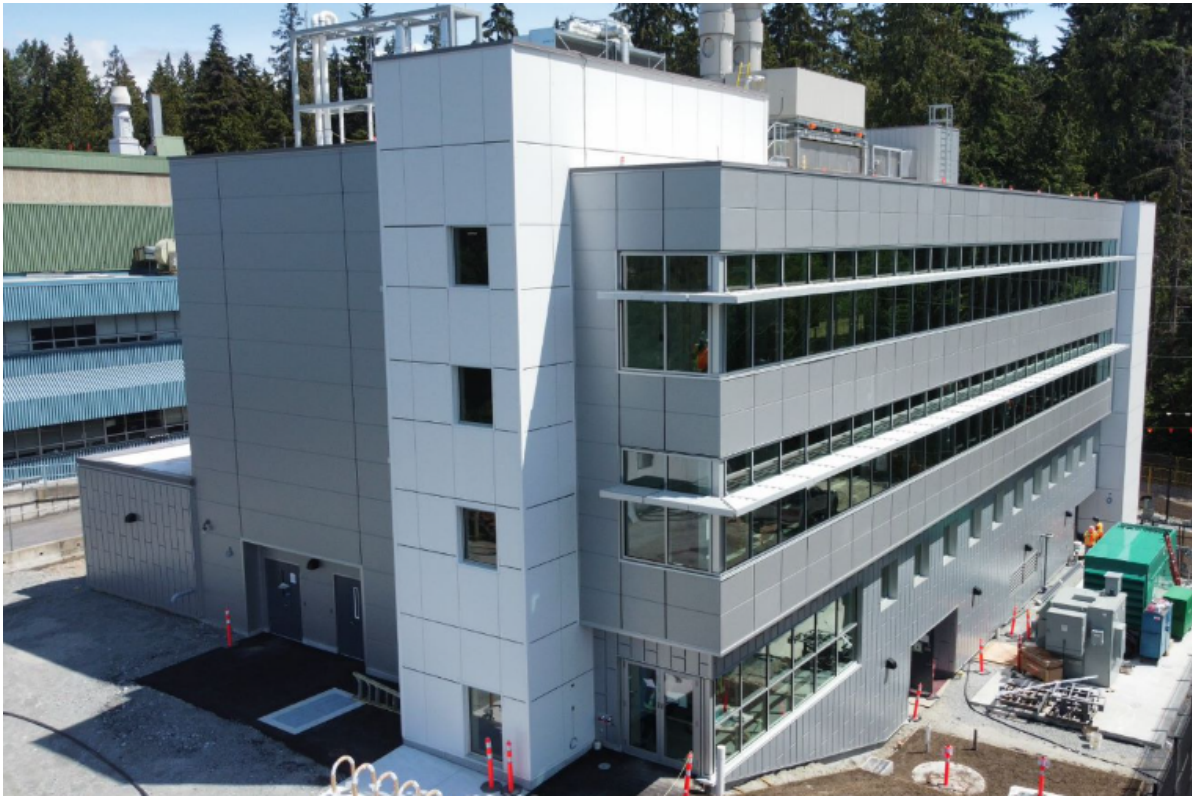
- 2023: CANREB back in user operation
- 2026: first beam from AETE
- 2027: first beam from APTW
- 2028: first therapeutic isotopes from ARIEL





# TRIUMF's Accelerators - IAMI

- New \$50M facility to support production and research into next generation medical isotopes & radio-pharmaceuticals
  - Provides isotope security
  - Enables R&D + clinical trials
- Funding announced by Prime Minister on November 1<sup>st</sup>, 2018
  - Contributions from Federal and BC governments, BC Cancer, BC Cancer Foundation, UBC and TRIUMF
- Building substantial completion reached this past summer; soft commissioning underway





# People & Skills – Student Programme

TRIUMF's undergraduate co-op programme has returned to normal recruitment, with all positions returning to in-person

In this winter term, TRIUMF piloted a new “dual intake” recruitment strategy to boost uptake of students onto non-traditional areas at the lab (e.g. admin, technicians, operations). The effort appears successful, with approximately 76 students (a new record!) hired for the summer term

TRIUMF is on track to reach our target of 150 undergrads/year by end of 2024





# People & Skills – Communications

Paused since March 2020, in-person public outreach effort have begun to ramp up in 2023, with the laboratory hosting numerous student groups and supporting various outreach events

In April, TRIUMF has also restarted its public tour program with at least 2 tours available per week. Supported with trained guides from TRIUMF's Graduate and Postdoc Society, the program has seen tremendous uptake, with all available tour slots currently booked up through the summer







Welcome to Science Week!



*NAVIGATING  
NEW HORIZONS*