

# Vision

for Life Sciences

“Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.”

-Marie Curie



“At 11, I could say "I am sodium", and now at 79, I am gold.”

-Oliver Sacks

# Introduction and Presentation Objectives

## **What's in this presentation:**

- Overview of Life Sciences at TRIUMF
- Non-exhaustive summary of committee perspectives on divisional potential

## **Goal of this summary:**

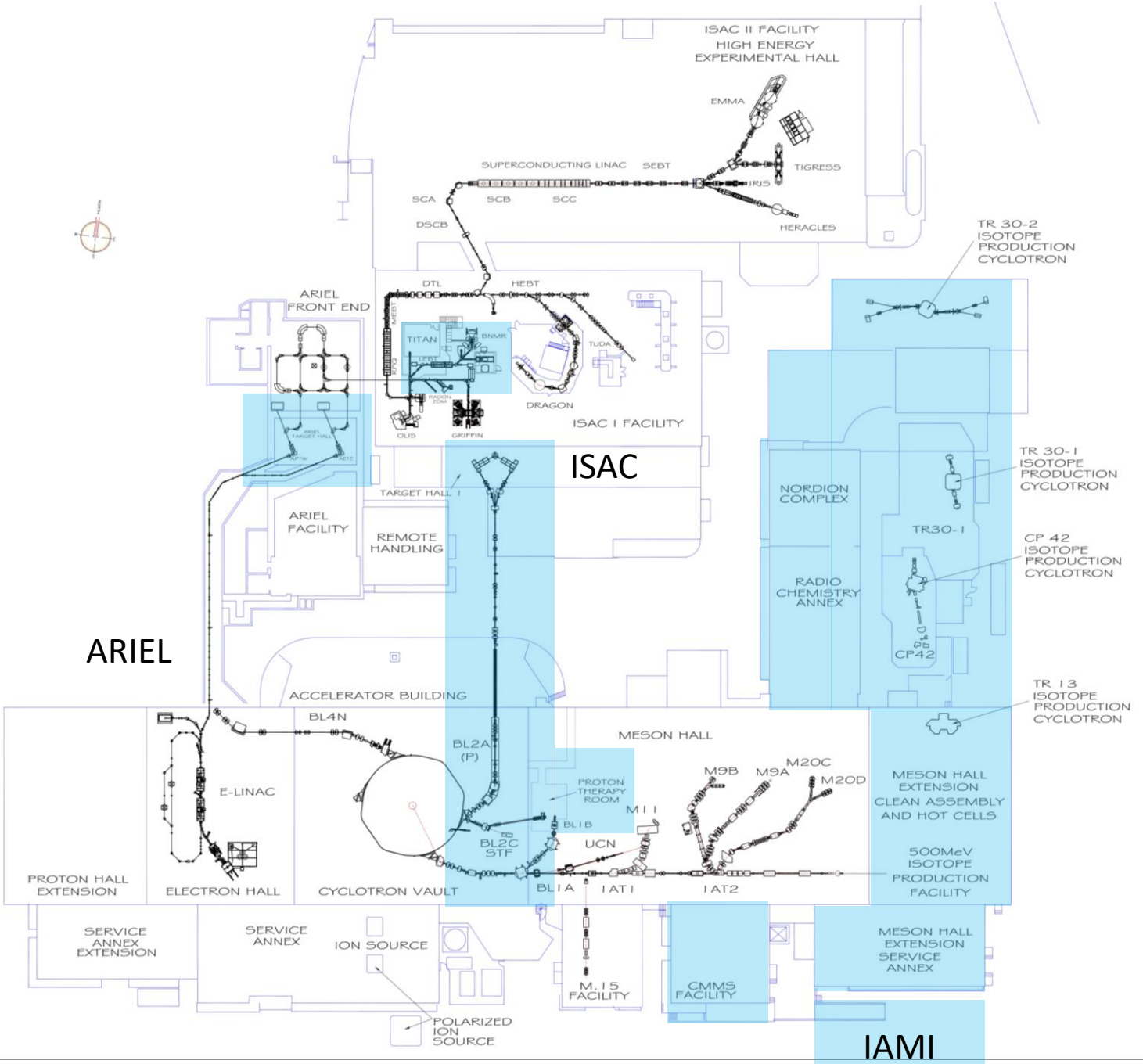
- Entice all to review summary materials
- Provoke (provocative) thought on what TRIUMF as whole can do through a Life Sciences lens

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# First, some perspective

- Since 1968, TRIUMF has remained relevant by adapting its science and expanding its campus. There's no reason to believe that will change any time soon
- TRIUMF is currently investing significantly into the Life Sciences infrastructure and program
  - These investments have multi-decade life expectancies
- Lab-wide buy-in toward isotope, beam therapy and spectroscopic programs is notable and appreciated

# Life Sciences at TRIUMF 2021



- Five H<sup>+</sup> medical cyclotrons:
  - Isotope production
  - Radiochemistry
  - Proton Therapy
  - Bio-βNMR
- Partnerships:
  - UBC, multiple faculties
  - SFU
  - BC Cancer
  - Member universities
  - BWXT, Fusion

## What is TRIUMF Life Sciences Today? What does it do?

- TRIUMF LS is globally unique with access to tools, infrastructure and people not readily available elsewhere
  - Multidisciplinary: chemistry, biochemistry, radiation physics/safety, medicine, biology, none of it works without engineers, technical expertise
  - Impossible to replicate knowledge, capabilities
  - Cradle to grave ideas ecosystem
  - Nimbleness and receptiveness to new ideas
  - A place where the sum is greater than the combination of its parts
- Strategic Initiatives:
  - Isotopes for imaging and therapy (but not just for health);
  - FLASH therapy;
  - $\beta$ NMR
- Robust partnerships: UBC, BC Cancer, SFU, BWXT, Fusion,...
- Strong translational (clinical and commercial) potential
- LS is highly reliant on other divisions and collaborators to accomplish research; needs significant coordination

## What trends will shape TRIUMF's future?

- Health, energy, environment (and education) will require fundamental research as a foundation to be ready for the unanticipated:
  - Supply: Isotope shortages (MI and RIT will be mainstream clinical tools)
  - Discovery: IAMI (5 programs);
    - Ability to develop the next 'tope/tool;
    - New agents to manage diseases resistant to conventional therapy
- Future of work/training: location and schedule will become more dynamic
  - Work will be both on-site and virtual
  - Remote/virtual access to HQP/collaborators/general public

### Risks:

- Need to maintain strategic focus/critical mass to drive innovation, keep momentum
- Train and retain key talent in mobile world
- Balance protecting ideas with academic reporting
- Maintain connectedness, inclusion in the new virtual world

## In 2041, What will TRIUMF look like?

- Possibility of evolve to multiple (multi-disciplinary) campuses?
- Significant virtual (cloud) presence (data storage, analysis)
- TRIUMF will be seen as more of an applications laboratory
- Renewed campus:
  - ARIEL, IAMI
  - IAMI phase 2; TR100; catalyze innovation; technology accelerator
  - additional support infrastructure (waste management)
- Integrated groups/divisions to foster ideas cross-pollination

## What will TRIUMF Life Sciences be in 2041?

- A hub/multi-disciplinary centre for global community to do research
- True to its origin: A division with core expertise in chemistry/radiochemistry, dose preparation, utilizing hot and cold labs; in vivo work
- Continued efforts to develop PET/SPECT, multimodal imaging
- Transition to include diagnostic and therapeutic (alpha-, beta-, Auger) applications
- Smarter Therapeutics:
  - Dosimetry/treatment planning, consoles/cloud interface
  - proton therapy/FLASH, state-of-the-art cancer treatment
- Strong partnerships to drive clinical translation
- New innovations, including new machines to contribute to health innovations
- A legacy in neuroimaging, big current bets in cancer research, should consider new disease areas that we can contribute
- Be unique, maintain R&D emphasis



# Our Vision for Life Sciences

## Think Big

### Pursue Creative, Impactful Science

TRIUMF is inherently multidisciplinary and translational, bringing together science, creativity, innovation and novel infrastructure; encouraging and inviting collaborators from around the world to answer some of life's most difficult questions.

## Be Different

### Apply Physics to Life

TRIUMF Life Sciences will be an engine that applies accelerator science toward the study of life – in order to derive maximum societal benefit.

TRIUMF has globally unique infrastructure, rare talent, and an innovative mindset to better life for all.

## Be Bold

### Train and Send Forth World-Class Talent

Creative, impactful research will be woven into the cultural fabric of TRIUMF Life Sciences; training a generation of innovative thought and technology leaders to work collaboratively across disciplines to ask tough questions and derive elegant answers.

	Now	Action	2042
Think Big: Pursue Creative, Impactful Science	<ul style="list-style-type: none"> <li>Research and expertise are not leveraged to full potential</li> <li>Responding to, rather than anticipating societal challenges</li> </ul>	<ul style="list-style-type: none"> <li>Mature research program to maximize time for science, with creative focus;</li> <li>Provide proper administrative and operations support to enable productive researchers</li> </ul>	A robust research program with numerous collaborations pursuing a spectrum of basic and applied research to address societal issues
Be Different: Apply Physics to Life	<ul style="list-style-type: none"> <li>New infrastructure emerging, with significant efforts applied to rejuvenate legacy facilities</li> </ul>	<ul style="list-style-type: none"> <li>Build and configure a group of facilities with timeless capabilities;</li> <li>Enable multidisciplinary research in a globally-unique setting</li> </ul>	TRIUMF is recognized as THE place to go for accelerator and isotope science to understand life at the molecular level
Be Bold: Train and send- forth world- class talent	<ul style="list-style-type: none"> <li>TRIUMF-based scientists struggle to recruit trainees</li> <li>Trainees work hard to collect data from disconnected facilities and non-optimized workflow</li> </ul>	<ul style="list-style-type: none"> <li>Configure program to be a rewarding, cross-disciplinary training experience across the post-secondary spectrum</li> </ul>	A continuous output of thought leaders trained in an inclusive, multidisciplinary and collaborative culture

# Think Big – Pursue Creative, Impactful Science

TRIUMF is inherently multidisciplinary and translational, bringing together science, creativity, innovation and novel infrastructure; encouraging and inviting collaborators from around the world to answer some of life's most difficult questions.

- Build a strategic, innovative research program focused on translating basic science into applied solutions for the betterment of society
  - Ensure access to unique talent and infrastructure, TRIUMF can be a world-class centre for both basic and applied research
  - Establish the right partners and prioritization to allow research at TRIUMF to fundamentally alter our understanding of life
  - Leverage the economic benefits of applied research to fuel the exploration of new concepts and ideas
- Create a network of researchers and facilities
  - Connect with other academic, but also industry and government partners to expand TRIUMF's geographical footprint with the benefit of added infrastructure and financial resources

## Be Different – Apply Physics to Life

TRIUMF Life Sciences will be an engine that applies accelerator science toward the study of life – in order to derive maximum societal benefit

TRIUMF has globally unique infrastructure, rare talent, and an innovative mindset to better life for all

- Renew and expand infrastructure to allow efficient and impactful research
  - Build TRIUMF's accelerator capabilities in isotope production, beam therapy and rare isotope research to be unparalleled and beyond the capabilities of other facilities
- Research impact can be magnified with strategic partners
  - Create a national and international network of facilities with complementary capabilities and low-barrier access to emerge with a research program that is greater than the sum of its individual parts
  - Leverage TRIUMF's unique infrastructure to build a sustainable technology translation ecosystem with public and private partners

# Be Bold – Train and Send Forth World-Class Talent

Creative, impactful research will be woven into the cultural fabric of TRIUMF Life Sciences; training a generation of innovative thought and technology leaders to work collaboratively across disciplines to ask tough questions and derive elegant answers.

- Foster an inclusive program that enables a diverse workforce
  - Provide administrative and operational support that allows researchers to pursue strategic research and development opportunities
  - Partner with public and private-sector partners to provide a translational pipeline for research and trainees
- Ingrain a robust training program focused on developing technology and thought leaders
  - Establish a strong recruitment program to attract talent
  - Connect with accredited institutions to enable and satisfy education goals

Thank you  
Merci

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