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

TRIUMF

“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:

- Brief overview of Life Sciences facilities 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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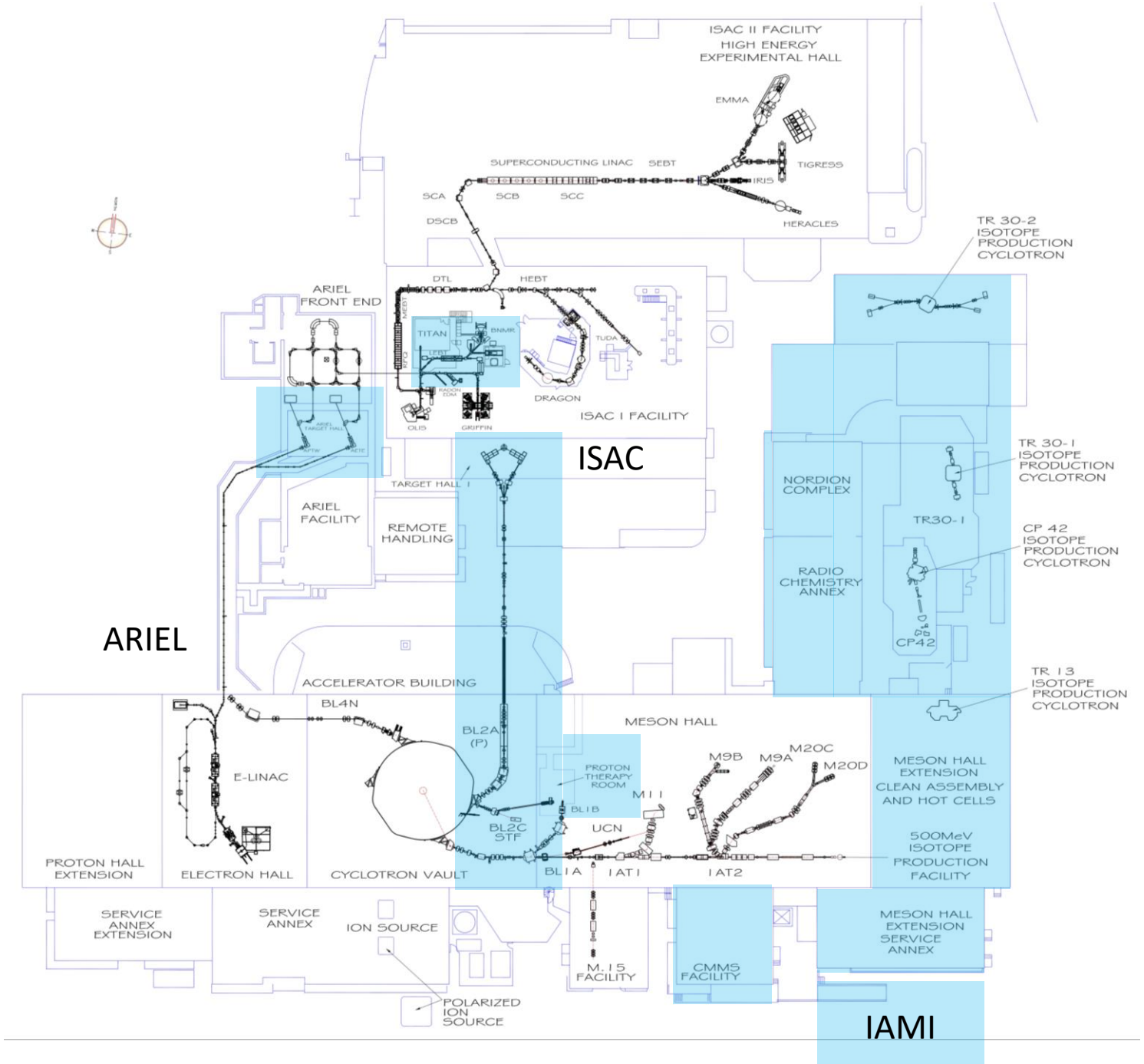
First, some perspective

- 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^- 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;
  - βNMR
- 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, brining 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	• Research and expertise are not leveraged to full potential • Responding to, rather than anticipating societal challenges	• Mature research program to maximize time for science, with creative focus; • Provide proper administrative and operations support to enable productive researchers	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	• New infrastructure emerging, with significant efforts applied to rejuvenate legacy facilities	• Build and configure a group of facilities with timeless capabilities; • Enable multidisciplinary research in a globally-unique setting	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	• TRIUMF-based scientists struggle to recruit trainees • Trainees work hard to collect data from disconnected facilities and non-optimized workflow	• Configure program to be a rewarding, cross-disciplinary training experience across the post-secondary spectrum	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, brining 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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