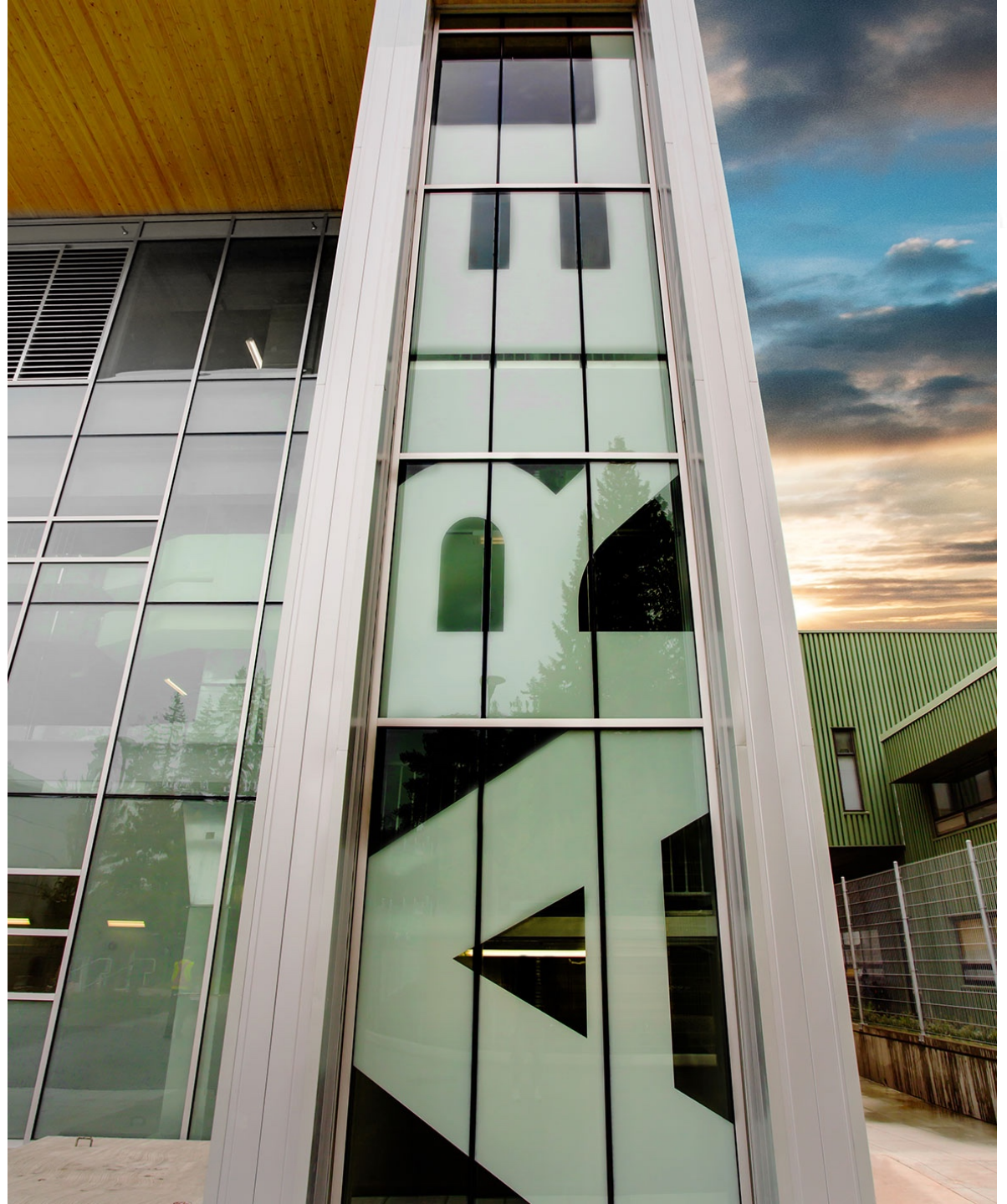


Roadmap for a 20-year Vision for TRIUMF

Reiner Kruecken

Science Week – August 17, 2020



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

TRIUMF's research portfolio, from fundamental to applied:



Expands the boundaries
of human knowledge



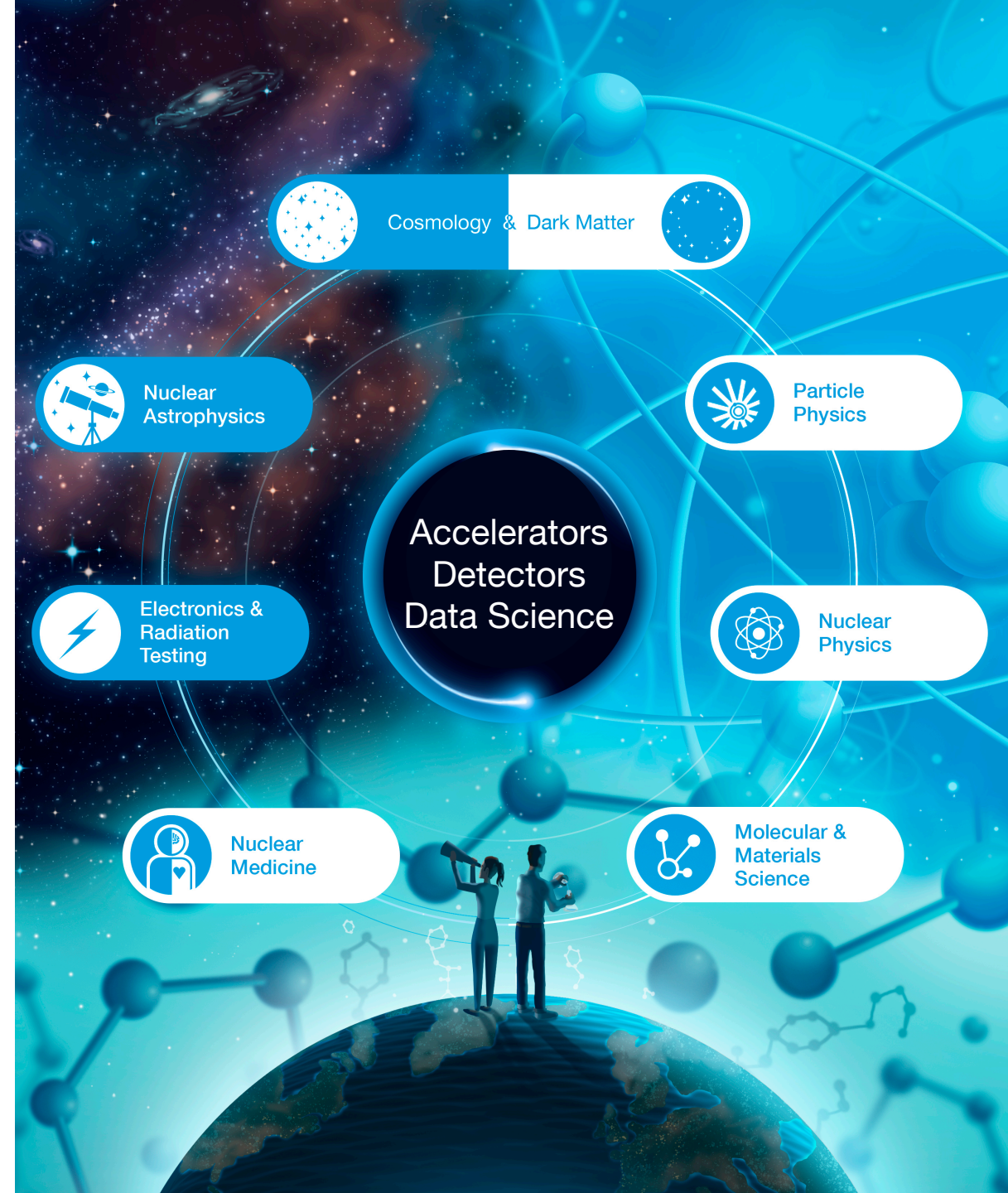
Advances the treatment
of critical diseases



Develops new technologies
and innovations



Deepens our understanding
of the natural world



\$267.3M core operation funding
+ \$25M one-time supplement
allows us to move forward with our
Five-Year Plan 2020-2025

- Science and Technology
- People and Skills
- Innovation and Collaboration

... with some rebalancing



Leveraging three core platforms – ARIEL, IAMI, TRIUMF Innov. – the Plan delivers value across three critical dimensions:

- **Science and Technology**

- **Goal 1:** Make groundbreaking discoveries across TRIUMF's multidisciplinary research portfolio
- **Goal 2:** Reinforce TRIUMF as a globally leading particle accelerator centre

- **People and Skills**

- **Goal 3:** Become a hub for interdisciplinary education and training
- **Goal 4:** Inspire Canadians to discover and innovate

- **Innovation and Collaboration**

- **Goal 5:** Translate knowledge and discovery into innovation
- **Goal 6:** Increase national and international collaboration

Priorities for 2020-2025

- **ARIEL** – advance CFI project towards 2026 completion with phased science delivery
- **IAMI** – complete construction in 2022 and ramp up medical isotope production
- **TRIUMF Innovations** – advance key commercial opportunities
- Utilize \$25M supplement to enhance reliability, safety, and efficiency, addressing key risks
- Deliver world-class on-site science (ISAC, CMMS, UCN, Theory, Life Science, Accelerator Science)
- Lead selected off-site particle physics activities (ATLAS/HL-LHC, Hyper-K, nEXO, ALPHA)
- Continue site and process improvements (ERP System, TCC)
- Invest into people and skills (career development, student program, outreach)

Long term challenge:

- Sustainable operation of TRIUMF with ramp up of ARIEL & IAMI requires increased core funding level

Work is progressing

IAMI construction



ARIEL Target Hall
L1 shielding



ARIEL
Hot Cell

Cooling Tower
replacement

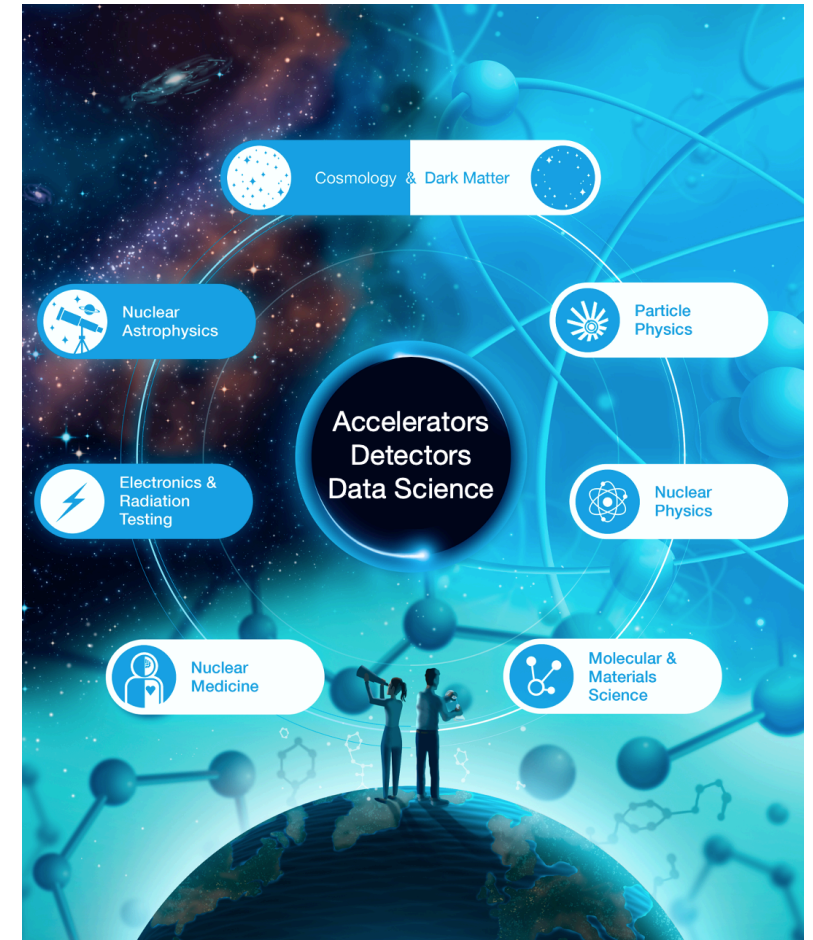


M9 Front-end



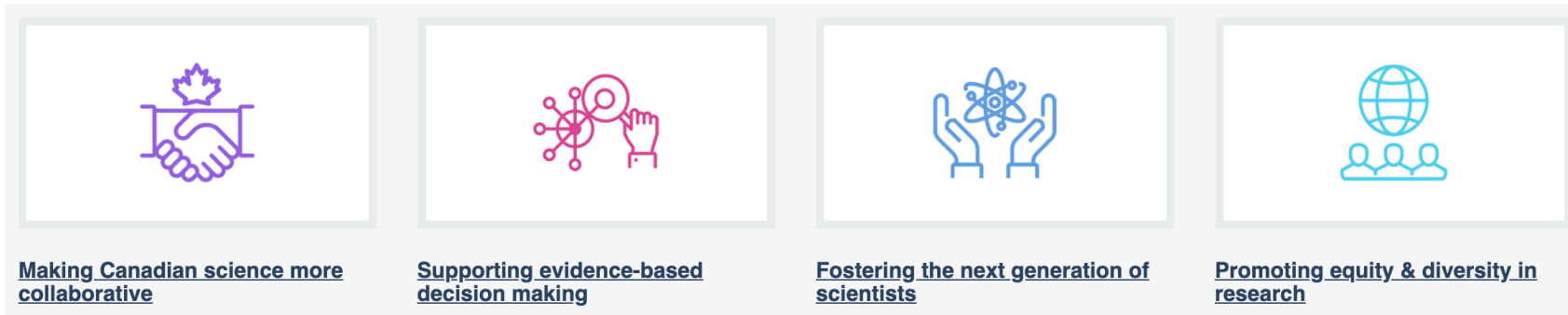
20-year Vision for TRIUMF

- Launching from the priorities of Five-Year Plan 2020-25 and guided by our Vision, Mission and Core Values we project ~20 years into the future
- **Output: High-level 20-year Vision Document by Fall 2021**
 - Target audience:
 - University Presidents
 - Tri-Agency & CFI Presidents
 - Deputy Ministers
 - Chief Science Advisor



Context: National Science Ecosystem

- Canada's Science Vision ([ISED](#))



- Big Science Landscape in Canada

- How will Canada evolve the management of its investments in “Big Science” in a more coordinated manner? (2017 Naylor report)
- How can TRIUMF further partner with universities, NRC, and other large-scale infrastructures to advance Canada's vision
- How do we best position TRIUMF in the Canadian science ecosystem?



Context: National and International planning

- **Long-range planning exercises**

- Nuclear and Particle Physics

- Canadian Subatomic Physics Long Range Plan (under way)
- Canadian Long Range Plan for astronomy and astrophysics (under way)
- European Particle Physics Strategy (2020 update)
- Snowmass Process for Particle Physics in the US (ongoing)
- NSAC Nuclear Science Long Range Plan in the US (2015)
- NuPECC Nuclear Physics Long Range Plan in Europe (2016/17)

- Molecular & Materials Science

- Frontiers of Materials Research - A Decadal Survey (2019)

- Nuclear Medicine

- US DOE-NP Isotope Program Long Range Plan (2015)

 Canadian Subatomic Physics
LONG RANGE PLAN SnowMass2021

Towards a 20-year Vision for TRIUMF

• Science and Technology

- What are the science drivers within each discipline?
- What big challenges can TRIUMF help address?
 - collaboration across disciplines
 - joining forces with other research institutions
- What are TRIUMF's unique opportunities for high impact science based on our expertise and infrastructure?
- How does TRIUMF stay a globally leading particle accelerator centre
- What are potential plans for next large-scale investments?

Convergence
Research



Towards a 20-year Vision for TRIUMF

• People and Skills

- How do we sustain a culture that embraces equity, diversity, and inclusion?
- What do workplace and work arrangements of the future look like?
- How do we attract and retain the best people?
- How do we strengthen interdisciplinary education and skills training?
- What does outreach of the future look like?



• Innovation and Collaboration

- How do we harness our expertise and technologies to solve real world problems?
- How do we connect our network with opportunities in the private sector?
- Who are our strategic domestic and international partners?



Towards a 20-year Vision for TRIUMF

- **Some aspects are easier to project than others**
 - ARIEL & ISAC and IAMI will play an important role in the long run
 - Meson Hall is a major pillar of the future (Quantum Materials, Isotopes, UCN)
 - Major subatomic physics initiatives in Canada and abroad (HL-LHC, SNOLAB, EIC, ILC, FCC)
 - **New large scale (\$100M class) initiatives in Canada that involve TRIUMF?**
 - Precision physics probing Beyond Standard Model physics – EDMs, radioactive Molecules, etc.
 - Neutrino and dark matter detectors (ARGO, $0\nu\beta\beta$, POne)
 - Photon and Neutron sources (THz e-linac, Compact Accelerator-based Neutron Source)
 - Radioisotope production and research (IAMI 2)
- **TRIUMF needs to be well positioned and nimble to stay relevant and maximize its impact**
- **User community and other stakeholders play an important role in developing the vision**

Preliminary 20-year Vision Roadmap

Timeline

- August 2020
 - Science Week kick-off
- Fall-Winter 2020/21
 - Topical workshops
 - e.g. Developing new Directions in Fundamental Physics
 - others tbd
 - 3-5-page briefs written by topical groups (to be set up)
- Spring 2021
 - Development of main 20-year Vision elements, guided by high-level Steering Committee
 - Community and stakeholder consultations (TUEC, PPAC, ACOT, BoM)
- Summer 2021
 - Draft 20-year Vision Document for review by BoM Science Council
- Fall 2021
 - Approval of 20-year vision by Science Council and BoM

Topical groups being considered

- Subatomic Physics
 - NP building on CINP brief to SAP-LRP
 - PP building on IPP brief to SAP-LRP
 - sub-groups across traditional topical lines (tbd)
 - e.g. Fundamental Physics with AMO techniques
- Life Sciences
- Probes for Quantum Materials and Biomolecules
- Quantum Technologies (e.g. Sensors, AMO)
- Scientific Computing
- Emerging trends in Convergence Research
- Accelerator Sciences and Facilities
- TRIUMF Site Development
- People and Skills
- Innovation & Collaboration

Thank you
Merci

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