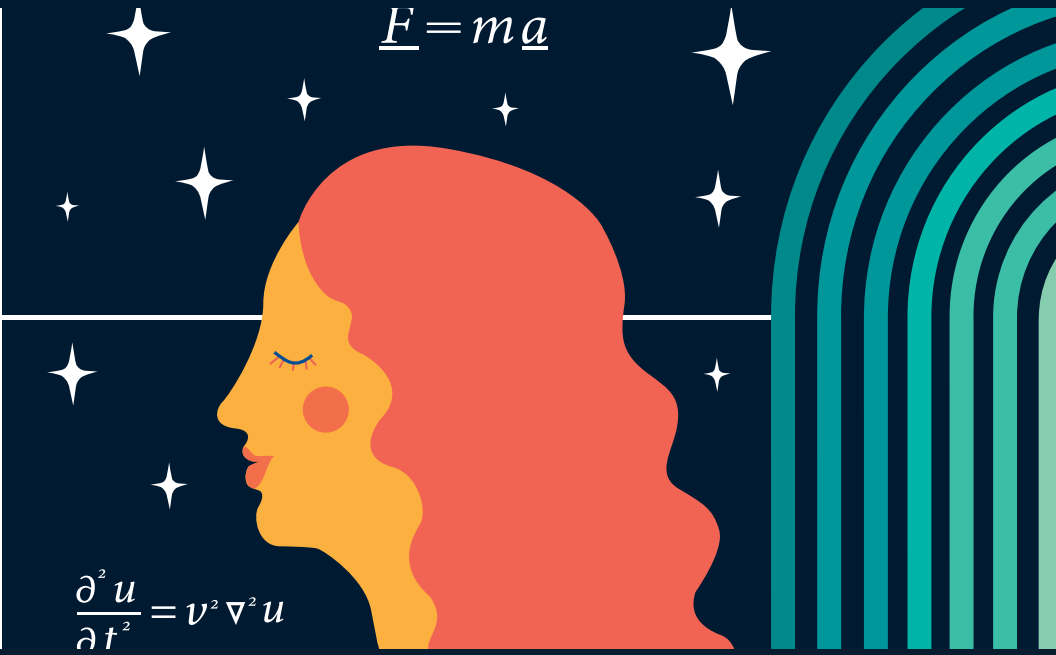
TRIUMF
CANADA'S PARTICLE ACCELERATOR CENTRE



TRIUMF

www.triumf.ca
@TRIUMFLab

4004 Wesbrook Mall
Vancouver BC V6T 2A3 Canada

MESSAGE FROM THE EXECUTIVE DIRECTOR

For more than fifty years, the TRIUMF community has served at the forefront of scientific research. Our leadership and contributions have pushed the frontiers of knowledge and improved lives in ways that the laboratory's founders could never have anticipated. Building on our legacy of success, we continue to chart an ambitious path forward for our science, our community, and those we serve.

Our work as science leaders is critically important, now more than ever. The world is facing a time of significant change, and we are navigating a number of obstacles that touch many aspects of our lives and our society, from climate change, through injustice and inequality, to a global pandemic. While TRIUMF may not be a driving force in addressing every issue, our contributions and influence on the world should not be underestimated.

Powered by some of the world's best and brightest, our community continues to find new and meaningful ways to put Canadian science and innovation at the forefront of the response to these challenges. We are leveraging our world-leading infrastructure, our expertise, and our global networks of collaborators and partners to drive progress in key areas of our strategic vision. We continue to strengthen the bonds that connect our science across the world, from the hunt for dark matter to the leading edges of particle physics or nuclear medicine, and beyond. We are maximising the impact of our science by generating innovative opportunities and propelling them to the market and into the communities we live and work in.

Our modern lab, now a non-profit corporation, sits at the centre of a strong and united national network of member universities and partners; our science communities extend from coast to coast, and across academic research, industry, government and beyond. These connections allow us to better fulfill our mission of serving as Canada's particle accelerator centre, empowering our efforts towards sustainability that leverage multidisciplinary collaboration and the effective use of Canada's major research facilities.

TRIUMF's future is bright. And though collectively we face many challenges, I know that our vision—for Canada to lead in science, discovery, and innovation, improving lives and building a better world—will continue to serve us well as we navigate them together.

Nigel Smith
Executive Director & CEO

WHAT DRIVES US

OUR VISION

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

OUR MISSION

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

OUR WORK

SCIENCE AND TECHNOLOGY

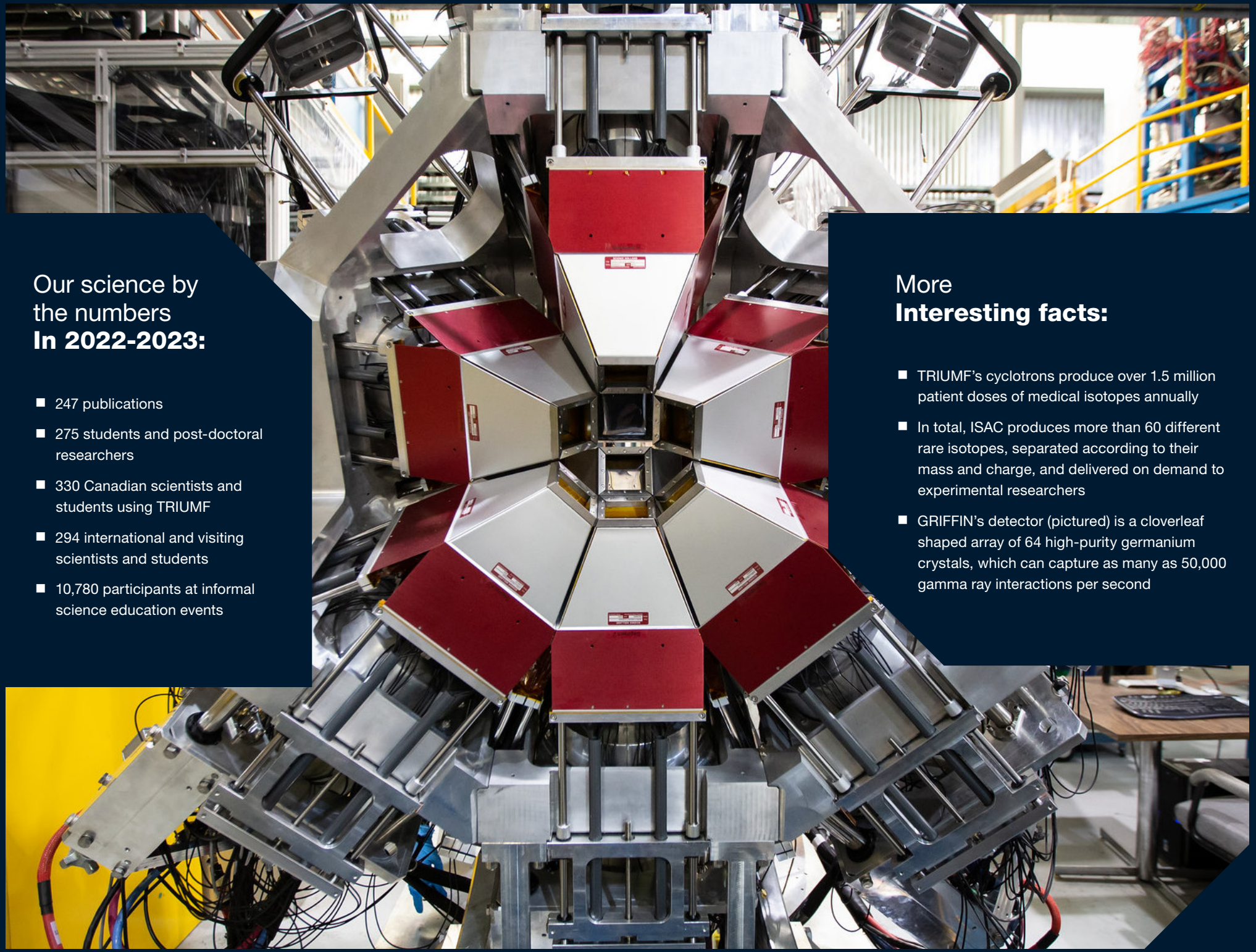
TRIUMF's multidisciplinary expertise and state-of-the-art infrastructure enable the Canadian science and technology community to carry out internationally recognized cutting-edge research. Our ground-breaking discoveries drive Canada's contributions to extending the frontiers of knowledge.

PEOPLE AND SKILLS

TRIUMF offers a unique training ground for the next generation of science and innovation leaders. We educate students at all levels, providing them with the skills needed to succeed in the knowledge economy.

INNOVATION AND COLLABORATION

As a hub for discovery and collaboration, we link leading universities and research centres across the country and act as Canada's gateway to international big science projects.



Our science by the numbers **In 2022-2023:**

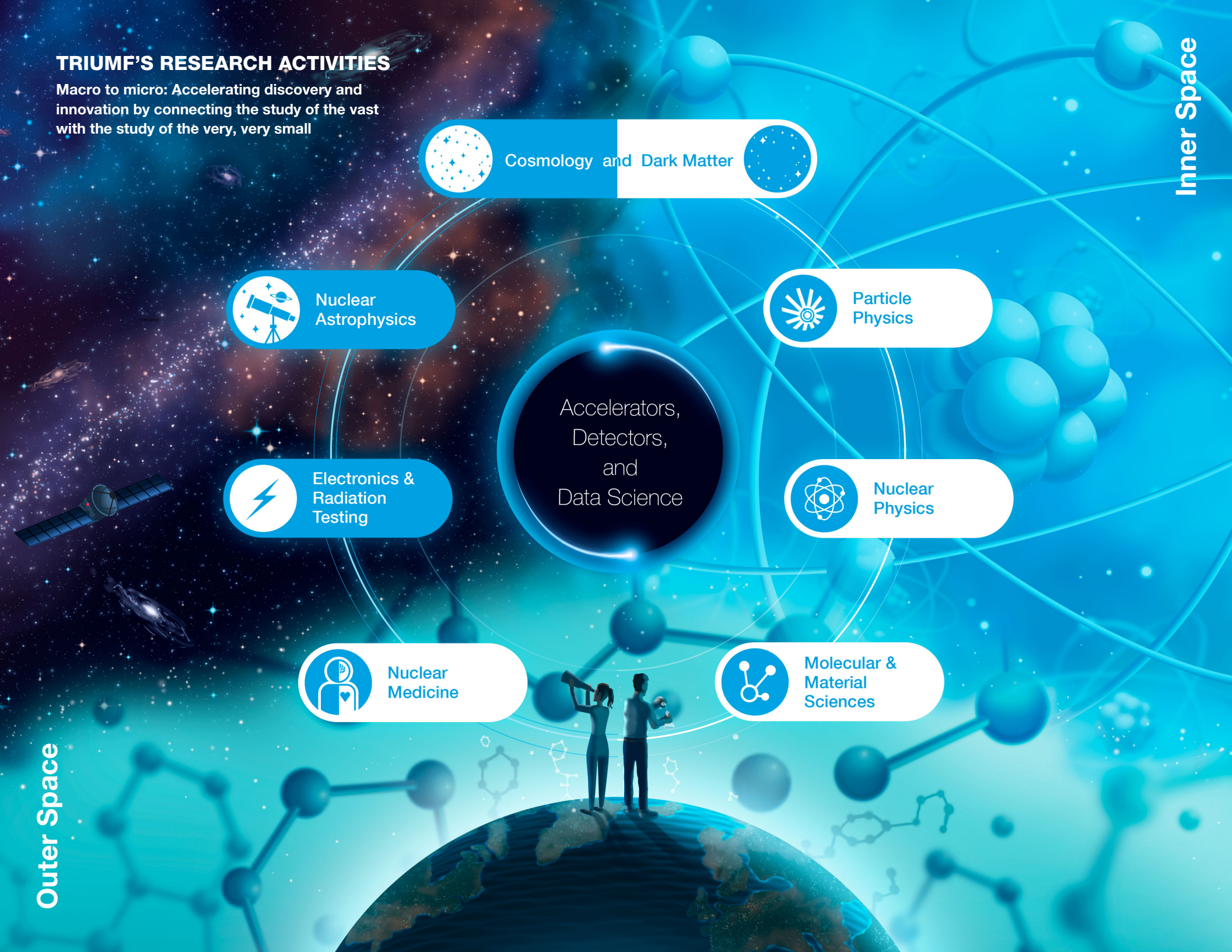
- 247 publications
- 275 students and post-doctoral researchers
- 330 Canadian scientists and students using TRIUMF
- 294 international and visiting scientists and students
- 10,780 participants at informal science education events

More **Interesting facts:**

- TRIUMF's cyclotrons produce over 1.5 million patient doses of medical isotopes annually
- In total, ISAC produces more than 60 different rare isotopes, separated according to their mass and charge, and delivered on demand to experimental researchers
- GRIFFIN's detector (pictured) is a cloverleaf shaped array of 64 high-purity germanium crystals, which can capture as many as 50,000 gamma ray interactions per second

TRIUMF'S RESEARCH ACTIVITIES

Macro to micro: Accelerating discovery and innovation by connecting the study of the vast with the study of the very, very small



ADVANCED RARE ISOTOPE LABORATORY (ARIEL)

The Advanced Rare Isotope Laboratory (ARIEL) will be one of the world's premiere multi-user facilities for producing rare isotopes. Powered by some of the most advanced accelerators and targets for producing and processing short-lived isotopes, ARIEL will revolutionize the study of isotopes for science, medicine, and industry. It will enable TRIUMF and its partners to pursue critical advances in the understanding of isotope production and the technologies to generate isotopes, all while shedding light on some of the most fundamental questions in science.

ARIEL Progress
at a glance

2010 — ARIEL receives funding and construction begins

2014 — ARIEL brings online the world's highest-power electron-linear accelerator for rare isotope production

2020 — First beam through CANREB and into ISAC-II experimental hall, bringing a first glimpse of ARIEL-era science

2026 — Radioisotope production runs are expected to begin at ARIEL

INSTITUTE FOR ADVANCED MEDICAL ISOTOPES (IAMI)

Canada is home to world-leading researchers, clinicians, and industrial partners who are working to realize the benefits that medical isotopes — valuable tools for diagnosing and treating life-threatening illnesses, from cancer to dementia to cardiac disease — can bring to society. As a hub for this activity, the Institute for Advanced Medical Isotopes (IAMI) will accelerate academic research and industrial collaboration, positioning Canada as a global leader in the manufacture and study of existing and emerging medical isotopes. IAMI will synergize Canada's medical isotope ecosystem and bring together diverse partners from across healthcare, industry, and academia.

IAMI Progress

at a glance

- The IAMI building was completed in 2022. Commissioning activities and preparation for operational start-up are underway
- IAMI is a key strategic component for the expansion of British Columbia's clinical PET program, and is envisioned to be a critical source of short-lived isotopes like fluorine-18 and gallium-68 as new diagnostic imaging centres come on-line
- In 2020, Health Canada approved cyclotron-produced technetium-99m for national implementation, boosting the availability of this critical isotopes for Canadian patients
- TRIUMF continues to build partnerships that increase production capacity for key isotopes, including PET tracers like zirconium-89 and alpha-emitters like actinium-225, a rare radioisotope that has shown great promise in clinical trials for the treatment of late-stage cancer

TRIUMF INNOVATIONS

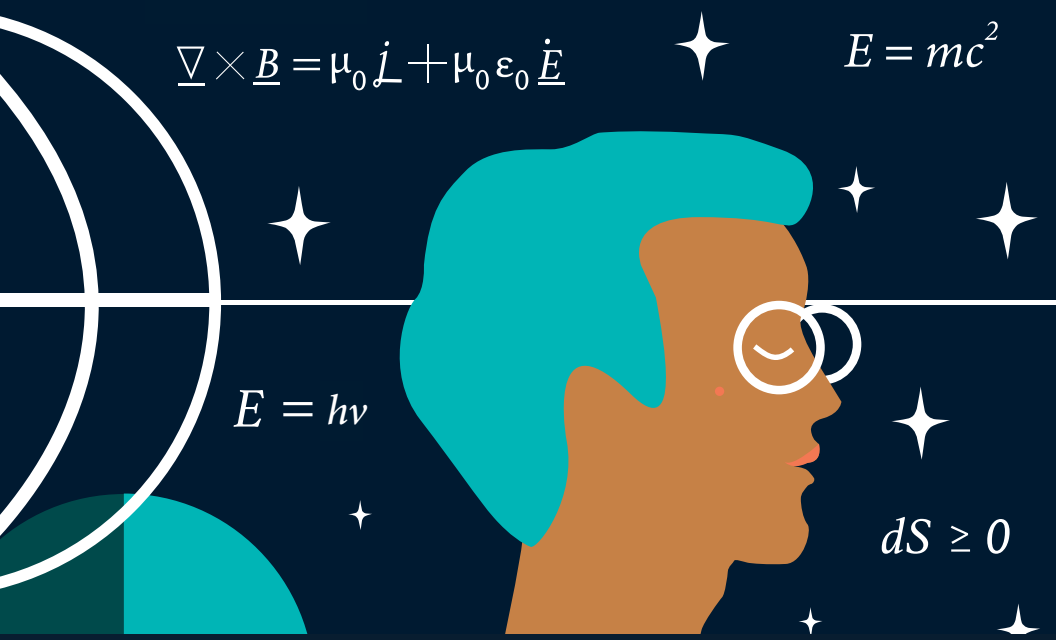
TRIUMF's network of innovators is constantly developing new tools and techniques that push the frontiers of knowledge. These scientific innovations hold immense promise for the world beyond the lab – including the marketplace. The dedicated team of technology transfer professionals at TRIUMF's commercialization arm, TRIUMF Innovations, connects scientific inventions and ideas from particle detectors to isotope manufacturing systems — and the innovators behind them — to opportunities in the private sector. TRIUMF Innovations also streamlines industry access to world-class expertise, ideas, and infrastructure across the TRIUMF network, which includes the laboratory's member universities, diverse industry partners, and international collaborators.

TRIUMF Innovations
at a glance

- TRIUMF spin-off ARTMS Inc. is a leader in the development of novel technologies and products that enable high-quality and high-yield production of the world's most-used diagnostic imaging isotopes
- Another spin-off, Ideon Technologies has become a world pioneer in the application of cosmic-ray muon tomography, providing x-ray-like visibility up to 1 km beneath the Earth's surface, enabling the identification of mineral and metal deposits with precision and confidence
- TRIUMF Innovations continues to support expanded production and availability of actinium-225, a valuable but scarce isotope with tremendous promise as a cancer treatment
- TRIUMF's proton- and neutron irradiation facilities (PIF & NIF) are premier test sites for assessing radiation effects in space, air, or at ground level. Each year, approximately 195 users from about 60 companies, laboratories, and universities test electronics or materials with TRIUMF beams

TRIUMF

Established in 1968 in Vancouver, TRIUMF is Canada's particle accelerator centre. The lab is a hub for discovery and innovation inspired by a half-century of ingenuity in answering some of nature's most challenging questions. From the hunt for the smallest particles in the universe to the development of new technologies, TRIUMF is pushing frontiers in research, while training the next generation of leaders in science, medicine, and industry.



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