Canadian Light Source | Centre canadien de rayonnement synchrotron

Annual Report | 2022

CANADIAN LIGHT SOURCE INC.

DISCOVERY AT THE SPEED OF LIGHT

Vision

As a valued Canadian voice for innovation, our leadership and world-class talent achieve excellence in light source services and solutions.

Mission

We enable science, learning, and socio-economic benefits through the provision of synchrotron light.

Values

SAFETY: We make safety paramount.

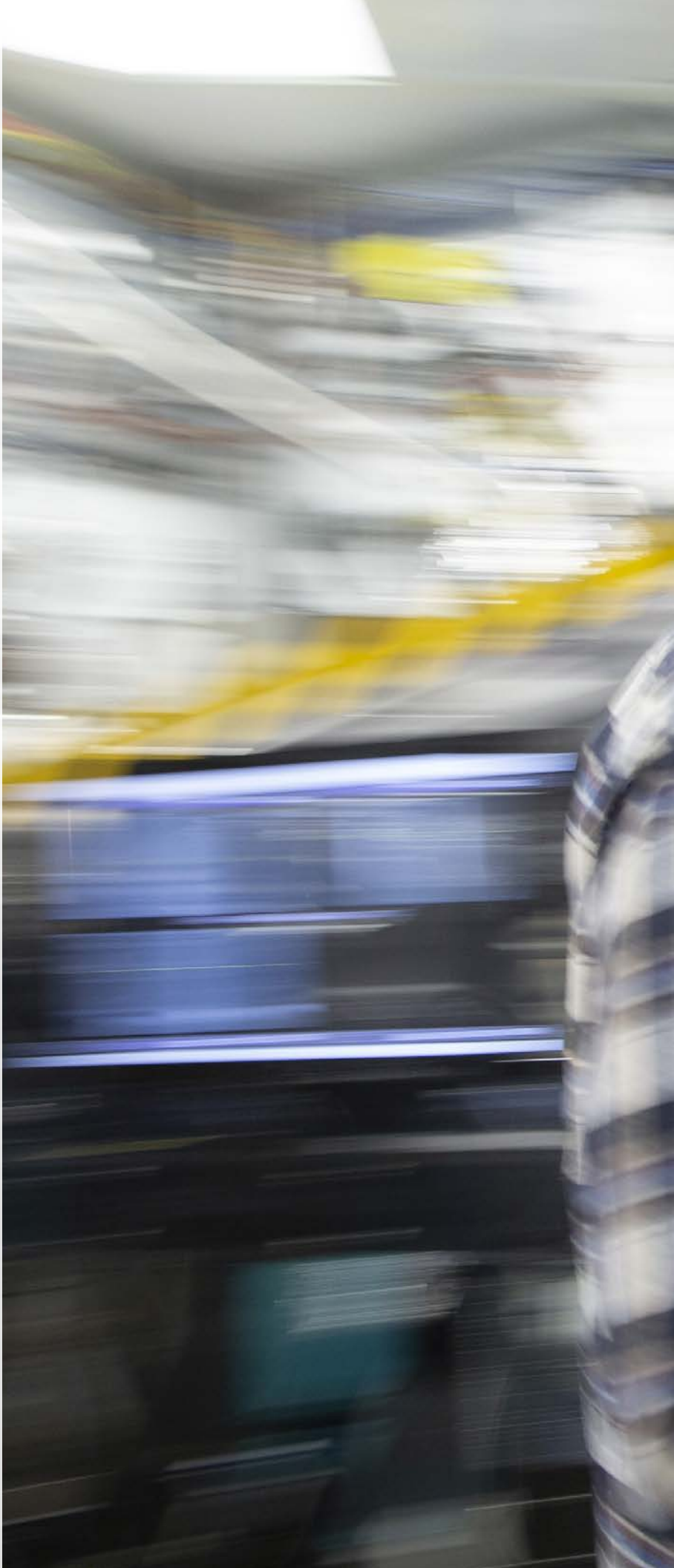
INNOVATION: We expand the boundaries of what is possible.

LEADERSHIP: We are leaders in light source applications, global science, and organizational excellence.

COLLABORATION: We enable collaboration among users, and sectors across academia, industry, and government.

EQUITY, DIVERSITY, AND INCLUSION: We are committed to equity, diversity, and inclusion.

ACCOUNTABILITY: We utilize resources responsibly and hold ourselves to the highest standards of ethics and integrity.



Message from the Chair of the Board

This has been a year of significant transition and renewal for the Canadian Light Source.

In July 2021, I began my term as Chair of the Board of Directors, along with my colleague Janet King, Vice-Chair. The Board had at that point already begun the recruitment process for the next Chief Executive Officer, following the announcement of Rob Lamb's retirement. We are appreciative of Rob's service over the seven years during which he led the CLS, and also grateful to Bill Matiko, Chief Financial Officer, who stepped into the Interim Chief Operating Officer position, to ensure the CLS continued to operate at the highest level, with the Board's counsel and expert support from the rest of the CLS executive team. At the time of writing this message, the Board is making good progress on the CEO recruitment process, with an announcement anticipated early fall of 2022.

The Board also led the development of a new strategic plan, a process that included extensive consultations with staff, users, advisory committees, funding agency representatives, and management. The plan lays out an ambitious and exciting course for the next 10 years that will ensure the CLS remains at the forefront of science, for Canada and the world.

As part of envisioning the future, the Board has partnered with the reinvigorated Canadian Institute for Synchrotron Radiation, as it begins a national conversation to understand the needs of the scientific community, and to plan for the long-term success of synchrotron science in Canada.

Canadian Isotope Innovations Corp. (CIIC), which produces safe, reliable and cost-effective medical isotopes using a dedicated novel linear accelerator facility developed initially by the CLS, announced a collaboration with Iotron Medical Inc. to produce the radioisotope copper-67 (Cu-67) for new cancer therapies. A spin-off of the CLS, CIIC is a an example of the potential of the CLS to support the development of new technologies that impact the lives of Canadians.

Vital to our success are our funders, whose support enables over 1,000 scientists to use our facility every year, advancing research in health, agriculture, the environment and advanced materials. The Board has strengthened our relationships with funders, including our owner, the University of Saskatchewan, and our operating funding partners, the Canada Foundation for Innovation, the Natural Sciences and Engineering Research Council, the Canadian Institutes for Health Research, and the Province of Saskatchewan. We are grateful for their support for CLS, its staff and users.

Lastly, on behalf of the Board of Directors, thank you to our staff and users for their patience and tenacity during the last year, as we continued to navigate this pandemic. We know that with your continued support, the CLS will remain a central component of Canada's science landscape for many years to come.

Pierre Lapointe Chair
Board of Directors

Message from the Chief Operating Officer

After another year of significant pandemic-related challenges for many, I welcome this opportunity to thank our employees, users and board members, whose adaptability and determination to make the best of difficult circumstances fuelled Canadian synchrotron science.

As seen in the pages of this report, CLS-enabled research over the last year, has contributed to discoveries in health - including COVID-19 research - agriculture, advanced materials, energy and the environment. More than 1,000 users collected data at CLS throughout 2021, including 703 graduate students and postdoctoral fellows, from 19 countries and 10 provinces across the country, representing 44 Canadian academic institutions.

In July, our Chief Executive Officer, Dr. Robert Lamb, retired and I was appointed interim Chief Operating Officer. I am grateful to my fellow directors whose support, leadership, and collaboration have been essential to maintaining our high standards of operation during this period of substantial transition.

In a significant achievement, we began operating in top-up mode this year, which allows our storage ring to operate in constant brightness across all beamlines, with increased reliability.

We were grateful that the Canadian Nuclear Safety Commission, our regulator, renewed our operating licence for an additional 10 years, attesting to the importance we place on heath and safety in our operations and culture.

Recognizing that one of our biggest strengths lies in our talented people, we continue to focus on employee engagement. Similarly, diversity, equity and inclusion remain a priority for our executive team, with several important new initiatives underway that will enrich our workplace and our research community.

As the world prepares for a post-pandemic normal, I am confident that with the support of our many stakeholders and the clear path set by our new strategic plan, the CLS will to enable vital discoveries and innovation for Canada and the world, for years to come.

Bill Matiko
Interim Chief Operating Officer &
Chief Financial Officer

HOW THE

Light Source *Works*

1

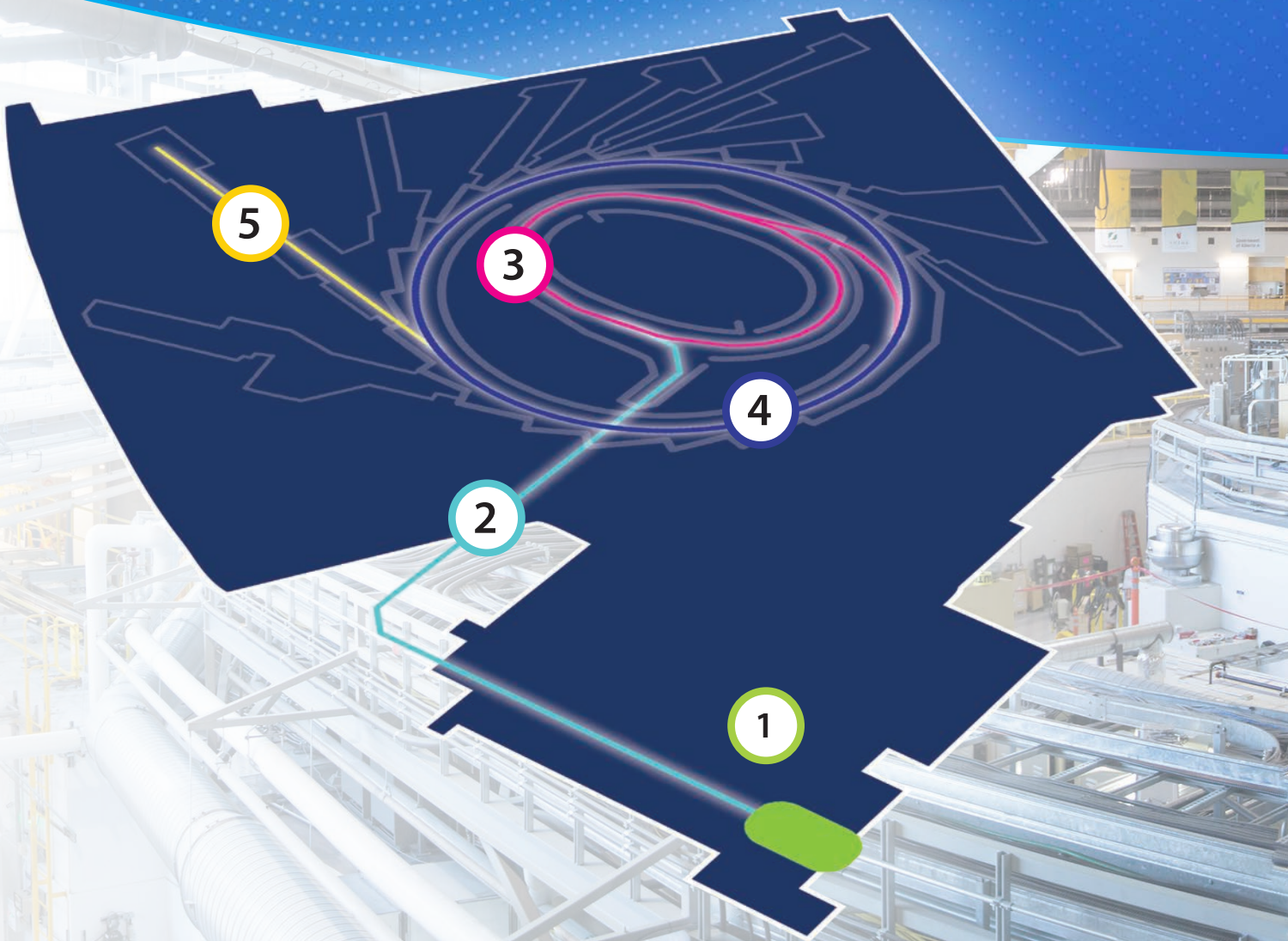
ELECTRON GUN

Bursts of electrons are injected into an ultra-high vacuum stainless steel tube.

2

LINEAR ACCELERATOR

Microwaves increase the speed of the electrons to 99.9998 per cent of the speed of light.



3

BOOSTER RING

In the ring, microwaves continue to accelerate the electrons; they travel around the ring 1.5 million times in 0.6 seconds.

4

STORAGE RING

Magnets bend the electron beam many times, producing a super bright light.

5

BEAMLINES

Beams of light are directed down the beamlines to experimental stations.

OUR YEAR

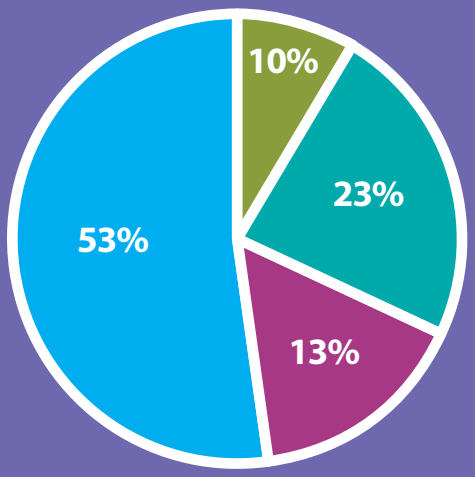
IN NUMBERS

4,495
SHIFTS
DELIVERED

521
SCIENCE PUBLICATIONS

USERS FROM 19 COUNTRIES AND 10 PROVINCES

USER DISCIPLINES



SHIFTS DELIVERED BY STRATEGIC AREA

- Agriculture
- Environment
- Health
- Materials

USERS FROM

44 CANADIAN ACADEMIC INSTITUTIONS

GRAD STUDENTS AND POSTDOCTORAL FELLOWS

703

1,037 DISTINCT USERS

259 STAFF

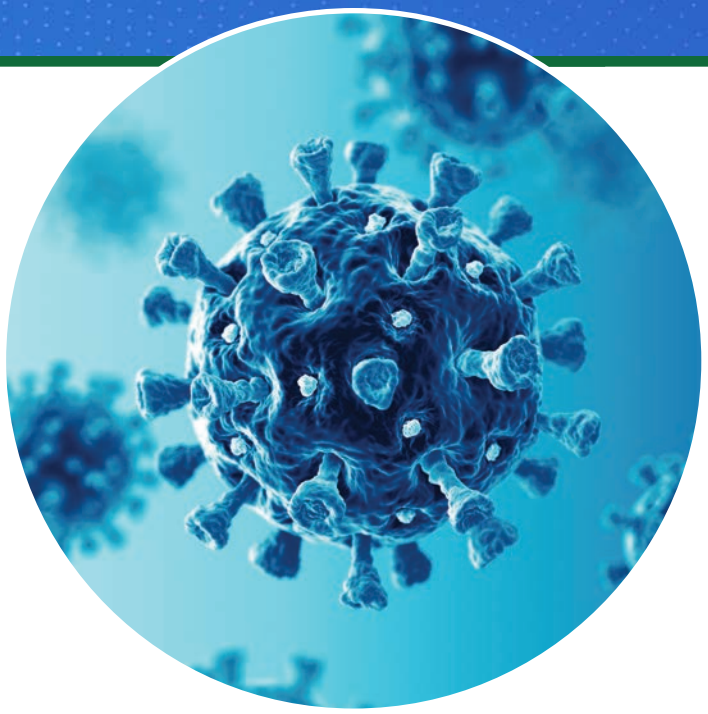
81 INTERNATIONAL COLLABORATIONS

900 BILLION ELECTRONS CIRCULATING IN THE STORAGE RING

ELECTRONS IN THE BOOSTER RING TRAVEL FAST ENOUGH TO REACH THE **MOON** IN 1.3 SECONDS

SCIENCE
HIGHLIGHTS

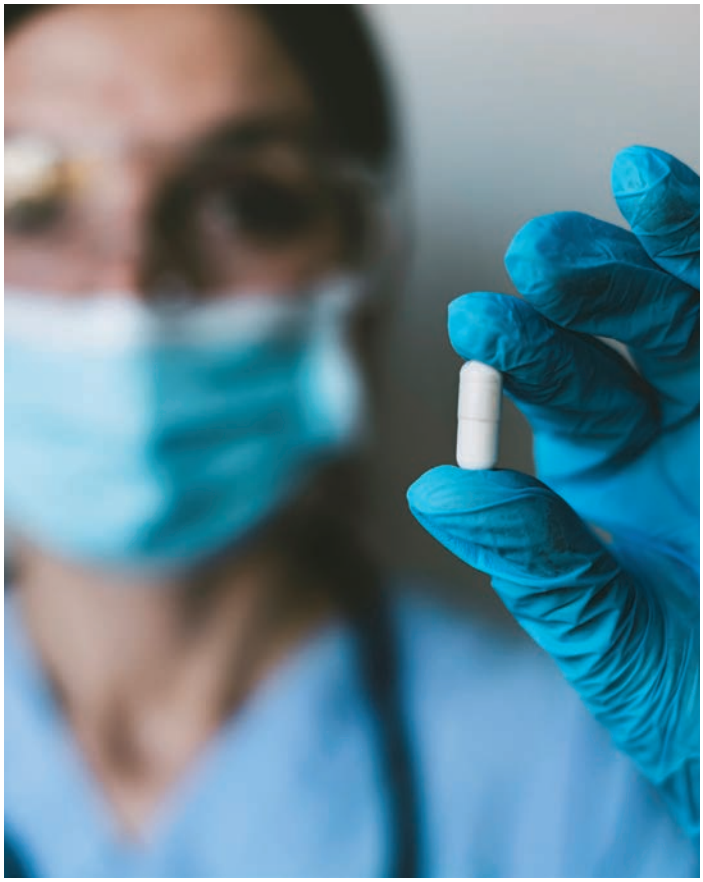
Fighting COVID-19



Creating an arsenal of COVID-19 therapeutics

A variety of tools are needed to effectively control the pandemic. Scientists are shifting their focus towards treatments that can help manage the disease for patients who develop serious symptoms. A McGill University research team used the CLS to develop a small molecule that may help combat COVID-19 and could contribute to a new arsenal of treatments making their way to market.

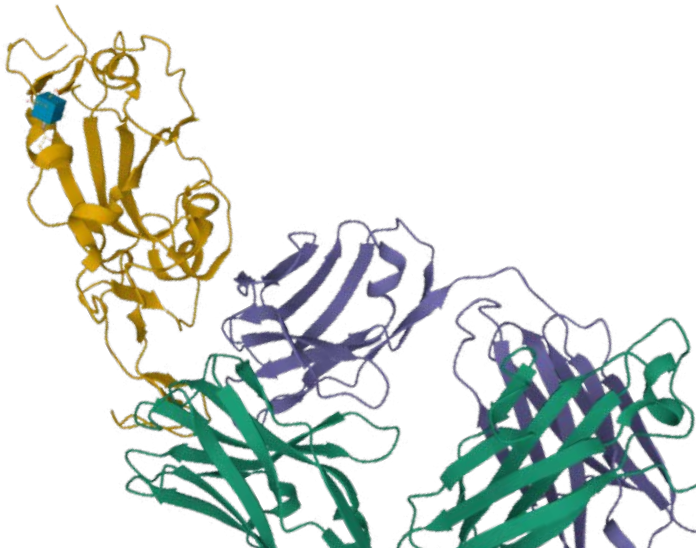
10.1016/j.ejmech.2021.114046



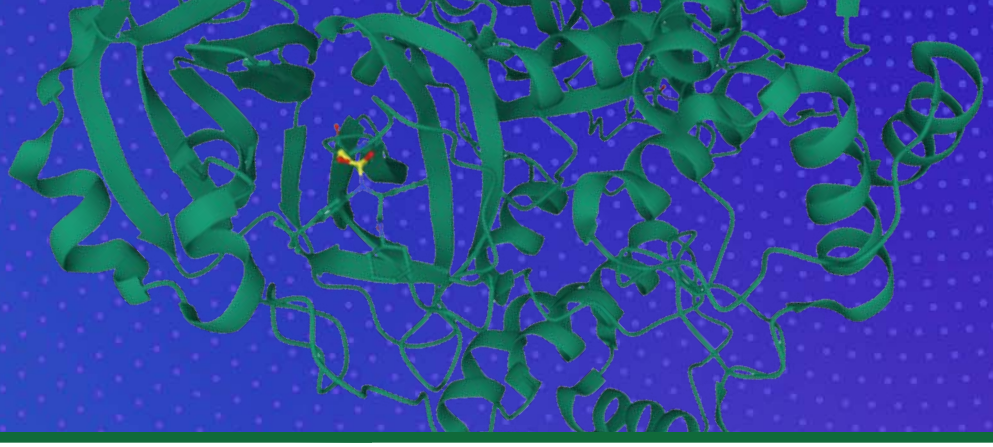
Developing antiviral drugs to treat COVID-19 infections

Researchers from the University of Alberta have isolated promising inhibitors that could be used to treat COVID infections. Synchrotron light allowed the scientists to find inhibitors that target a special kind of protein that the virus uses to multiply and harm human health. This research team wants to help make inhibitors available in a pill form, which would make it easier to treat COVID-19.

DOI: 10.1016/j.ejmech.2021.113584



PDB DOI 10.2210pdb7MLGpdb

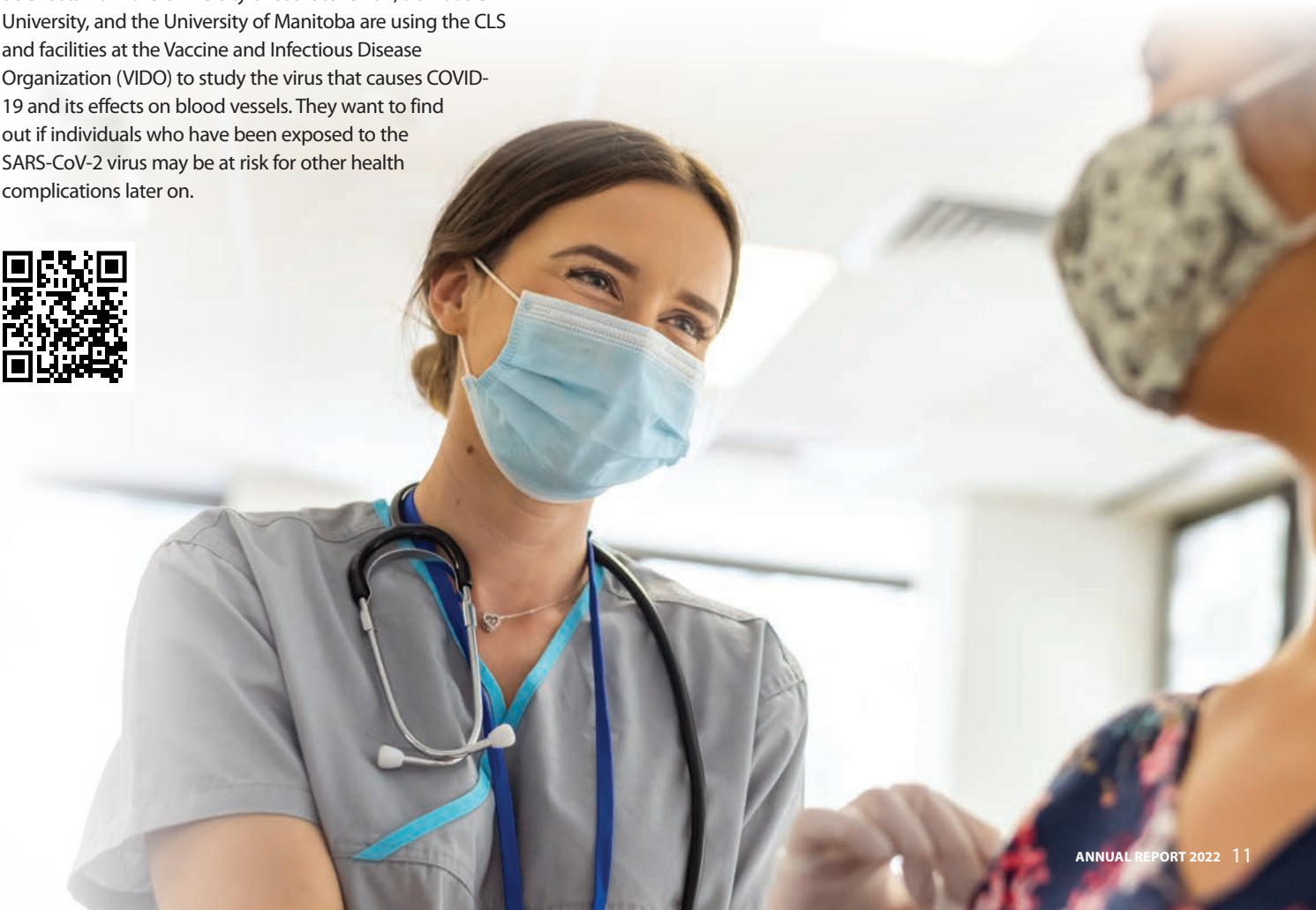


Investigating the long-term health impacts of COVID-19

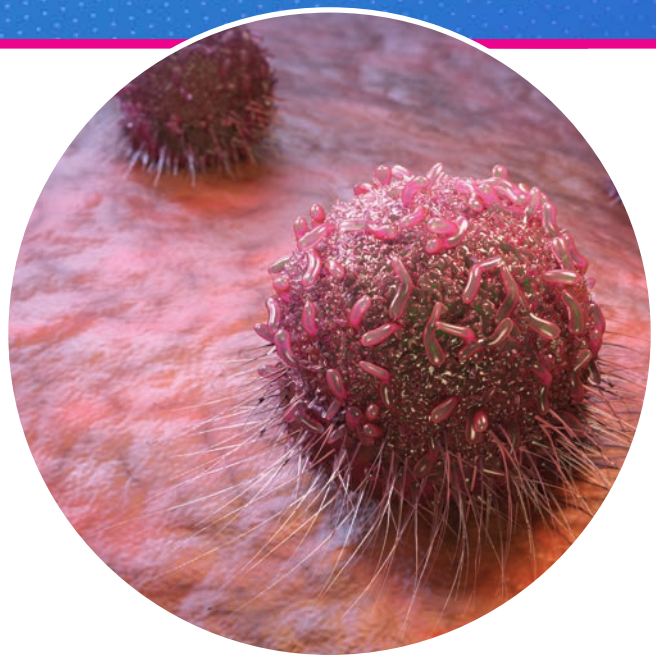
Scientists from the University of Saskatchewan, Dalhousie University, and the University of Manitoba are using the CLS and facilities at the Vaccine and Infectious Disease Organization (VIDO) to study the virus that causes COVID-19 and its effects on blood vessels. They want to find out if individuals who have been exposed to the SARS-CoV-2 virus may be at risk for other health complications later on.

Analyzing antibodies

Researchers have developed antibodies that can neutralize COVID-19. Once exposed, humans create antibodies to fight viruses but the same antibodies can also be created in the lab. A team led by University of Toronto scientists has developed synthetic antibodies that could be used to protect people, or as therapeutics for patients struggling to fight the virus. They will use the CLS to see in detail how the antibodies work against the coronavirus, foundational information that could lead to improved antibody therapeutics and guide vaccine design.



Protecting the health of Canadians



Fighting antibiotic resistance

McGill University researchers reported new insights into how a class of antibiotics commonly used in both medicine and agriculture are rendered useless by resistant germs. Added to the existing pool of knowledge about antibiotic resistance, this latest contribution could pave the way for next-generation antibiotics.

DOI: 10.1038/s41467-021-22016-3

Understanding how a key antibody targets cancer cells

Immunotherapy can be used as a precise intervention in cancer treatments. Scientists at the University of Toronto and the Hospital for Sick Children, with international collaborators from the United States and Spain, used the CLS to study how a candidate antibody therapeutic interacts with a surface receptor on cancer cells, which provides important molecular insights for designing improved cancer therapies.

DOI: 10.1016/j.jbc.2021.100966

Research to keep ageing brains lightning-fast

Researchers from the University of Northern British Columbia are working to pinpoint the causes of brain ageing and how we can prevent or reverse the damage of time. The CLS allowed them to see results in greater detail and to learn more about how changes in the brain impact myelin formation and degeneration.

DOI: 10.1007/s11064-021-03491-y

Developing pain medication with fewer side effects

Opiates like morphine and codeine provide many patients with relief, whether from the ache felt after mild surgery or from the chronic pain experienced by cancer patients. However, this type of medication can cause multiple side effects and lead to physical dependency with long-term use. Researchers with the University of Calgary and the University of Windsor used the CLS to image the structure of an enzyme responsible for the last step in the production of the drug codeine. The analysis gave the team ideas for how to modify naturally-occuring enzymes to ultimately create drugs that are more effective or have fewer side effects.

DOI: 10.1016/j.jbc.2021.101211

The future of stroke treatment

Stroke is the third leading cause of death in Canada. Researchers from the University of Saskatchewan, Columbia University, and the University of Oxford are researching a promising new therapeutic for stroke and other brain injuries. The team used synchrotron imaging to demonstrate that a medication currently used to treat schizophrenia in humans reduced swelling in a mouse model—a breakthrough that could lead to the development of new treatment options for stroke patients.

DOI: 10.1016/j.bbamem.2021.183573

Scientists develop new coating to protect kidney failure patients on dialysis

Researchers from the University of Saskatchewan and St. Paul's Hospital in Saskatoon used the CLS to help improve health outcomes for patients on dialysis. A main function of the kidneys is to remove toxins from the body. When they stop functioning properly, patients go on dialysis, a treatment where their blood is filtered by an artificial membrane, a process that can cause inflammation and adverse side effects. The team has developed a membrane coating that is more compatible with the human body resulting in fewer side effects for patients.

DOI: 10.1016/j.surfin.2021.101505.

Advancing agricultural research

Heating our homes with leftover canola

After years of meticulous research, a research team from the University of Saskatchewan's exploration of canola meal pellets as an eco-friendly alternative to coal and natural gas for both heat and energy is poised to move into its next phases—scaled-up pellet production and commercialization. Their quest is to find ways to turn leftover materials from crop production, like canola meal, into biocoal. In 2019, Canada produced over 18 million tonnes of canola and 10 million tonnes came from Saskatchewan.

DOI: 10.1016/j.ijhydene.2021.09.134

Using science to make the best chocolate yet

University of Guelph researchers used the CLS to study a key ingredient that could revolutionize the chocolate industry. In a world first, they were able to get detailed imaging of the internal structure of dark chocolate and confirmed that a specific molecule they added to the chocolate mass obtained the desired effect: the ideal structure for chocolate. Their discovery could mean forgoing the need for complex tempering machines for chocolate production.

DOI: 10.1038/s41467-021-25206-1

Finding the fertilizer sweet spot

Farmers walk a fine line when it comes to adding phosphorus fertilizer to their fields. If they don't use enough, they risk lower yields. If they add too much, the excess can be lost to runoff and lead to potentially toxic algae blooms in nearby lakes. Researchers moved science one step closer to finding the "sweet spot" for phosphorus fertilizer use. Using the CLS, the team, which included researchers from Agriculture and Agri-Food Canada, gathered highly detailed information about how fertilizing with nitrogen and phosphorus changes the chemistry of soils and the availability of phosphorus for crops.

DOI: 10.1016/j.geoderma.2021.115274

Promising green method for turning wastewater into fertilizer

Farmers rely heavily on fertilizers to help feed the world's over seven billion people. However, the only commercially available method to produce ammonia—a key ingredient in fertilizers—is not environmentally friendly. Scientists from Rice University recently developed a new process for converting nitrates in industrial wastewater into ammonia.

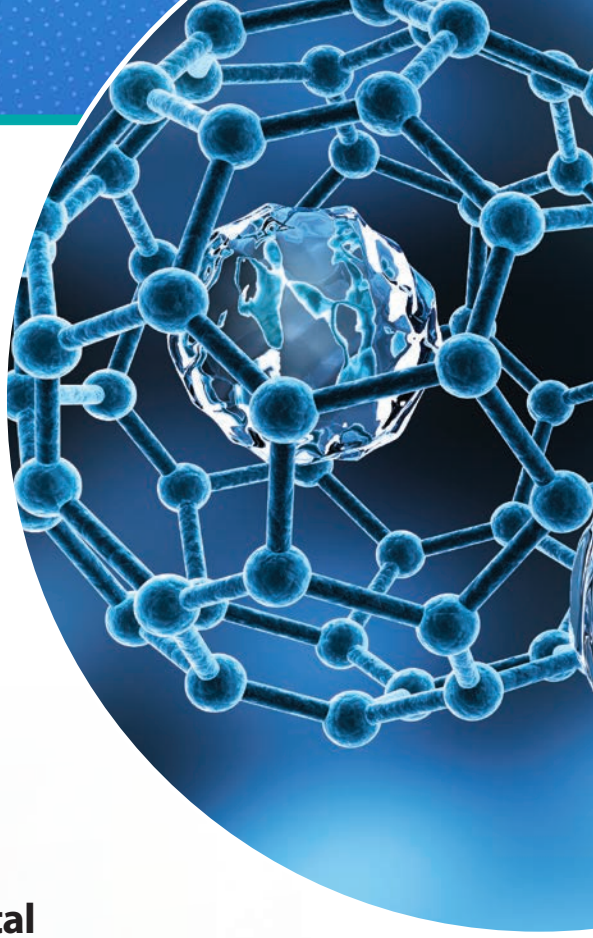
DOI: 10.1038/s41467-021-23115-x

Ground-breaking soil research could help increase crop yields and protect the environment

Researchers from the University of Saskatchewan collected and analyzed soil from across the prairies. Using chemical analysis and synchrotron techniques, the team looked at soil micronutrients in soil samples from Saskatchewan, Alberta and Manitoba. The study, which offers recommendations for improving fertilizer use and increasing crop yields for farmers, builds on previous studies they have completed as collaborators at the CLS.

DOI: 10.1139/CJSS-2020-0162

Protecting the environment



Blowing in the wind

Queen's University researchers have studied dust blown from legacy mine tailings at the Giant Mine in Yellowknife, NWT and determined vital information to help future remediation efforts. The researchers were able to determine the chemical form of arsenic in dust particles sourced from the Giant Mine tailings which intermittently blow into nearby communities. It was important for the wellbeing of nearby community members to understand what dust from these tailings might carry.

DOI: 10.1016/j.ijhydene.2021.09.134.

Greater environmental protection for mine tailings

An international team of scientists from Université du Québec and Queen's University, as well as France, Morocco, and Belgium used the CLS to identify harmful metals in mine tailing samples from Quebec. The findings disprove research done in the early 2000s that concluded the tailings posed little threat to the environment. The changes in the tailings over time show it can take years for the environmental threat to become apparent. The team hopes their findings will lead to greater environmental protection from mine tailings in the future.

DOI: 10.1016/j.scitotenv.2021.147105

New method uses waste to clean arsenic from lake contaminated by gold mine

Levels of arsenic in Northern Ontario's Long Lake are so high that some local residents can no longer drink the water. The toxin has been leaching into the lake from tailings at the abandoned Long Lake Gold Mine. A team of researchers from the University of Waterloo has shown that a passive form of remediation that uses common waste materials can remove virtually all of the arsenic from samples of lake water. The team examined core samples of the waste material and confirmed it had trapped virtually all of the arsenic as a mixture of arsenic sulfides and arsenic bound to iron minerals.

DOI: 10.1016/j.jhazmat.2021.127295

A cheaper method for hydrogen-based fuels

A University of Calgary research team used the CLS to help characterize an efficient catalyst that could make hydrogen fuel production more affordable. The team characterized the structural properties of catalysts made from nickel and iron oxide cheap materials that are cost effective alternatives to the precious metals generally used as catalysts.

DOI: 10.1039/D1TA02104D

Engine additive could help save on gas

A research team from Texas used the CLS to develop a new additive for automotive engine oil that reduces harmful emissions, increases fuel efficiency and improves durability. Conventional additives form a thin film on the surface of moving parts to reduce friction. The team studied how these coatings are formed on engine surfaces and how to create an innovative alternative.

DOI: 10.1016/j.wear.2021.203717 and 10.1021/acs.langmuir.0c02985

Creating next generation materials

Inside rechargeable batteries

Rechargeable batteries and electric vehicles are becoming more important as we work to protect the environment and the planet. Researchers from the Massachusetts Institute of Technology are using the CLS to understand how the chemistry of rechargeable batteries shifts, in sometimes surprising ways. A granular view of how lithium metal and the electrolyte evolve helps to guide battery design. Developing this technology will be key as we move toward heavier use of electric vehicles and going green.

DOI: 10.1021/acsenergylett.1c00117

X-rays capture ageing process in EV batteries

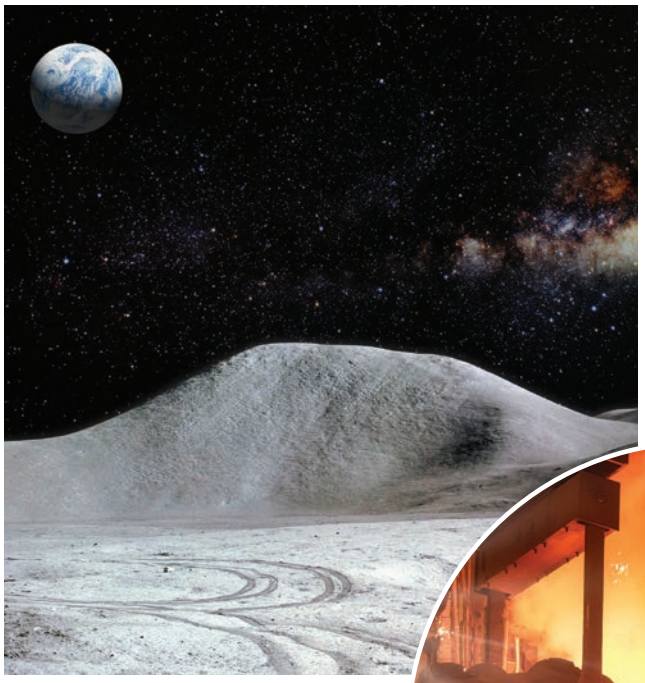
CLS and Dalhousie University researchers used CLS imaging to help engineer powerful electric vehicle batteries with longer lifetimes. Their research shows how the charge/discharge cycles of batteries cause physical damage, eventually leading to reduced energy storage. New work points to a link between cracks that form in the battery material and depletion of vital liquids that carry charge. The team also found that draining the battery a small amount caused less deterioration than discharging the battery all the way, an effect important to understand for new applications such as long-haul transport, electric aircraft, and using parked electric vehicles to store and deliver energy into the electrical grid.

DOI: 10.1149/1945-7111/ac4b83

Recreating outer space on earth

Extreme conditions—severe pressure, intense temperatures, and high levels of radiation—exist all over the Earth and beyond. Scientists from the University of Saskatchewan and the CLS wanted to learn how extreme conditions, like the vacuum of outer space, affect how water crystallizes into ice. They hope this could lead to a better understanding about what happens to water and organic molecules in extreme environments on Earth, like oil and natural gas pipelines that operate in cold Canadian winters.

DOI: 10.1021/acs.jpcc.1c08108



Coding molecules could help with burn victims and oil spills

Imagine if we could control and design molecules as easily as we can run code for a computer. Scientists from the University of Guelph are working to understand what causes some molecules to assemble on their own. If they can determine what drives this growth, then it could be harnessed for our benefit: from helping to heal burn victims to cleaning up oil spills. The team is using the CLS to try to observe what is going on at a structural level within small molecules that facilitates their mechanisms of self-assembly and to visualize their supramolecular hierarchical structures. They believe this research could help revolutionize multiple industries.

DOI: 10.1021/acs.jpcc.0c07671

Developing new alloys for hydrogen fuel and catalysis

Steel, an alloy of iron and carbon, offers increased strength as a building material. By mixing more elements together, scientists from Dalhousie University and the University of Maryland hope to create new and improved alloys with increased strength and improved corrosion resistance, which could help many industry sectors to reduce costs. Using synchrotron light, the team analyzed each element in their samples separately and could spot the differences in the structures of their two alloys. Next, they will try to link the changes in structure to the alloys' catalytic activity. Developing more effective catalysts could help improve chemical reactions in many industrial processes, from cars, to paper, laundry detergent, and beer.

DOI: 10.1016/j.xcrp.2021.100641

Financial Statements

CANADIAN LIGHT SOURCE INC.
March 31, 2022

Management's Responsibility

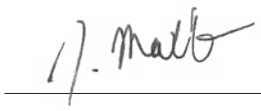
To the Member of Canadian Light Source Inc.:

Management is responsible for the preparation and fair presentation of the accompanying financial statements, including responsibility for significant accounting judgments and estimates in accordance with Canadian accounting standards for not-for-profit organizations. This responsibility includes selecting appropriate accounting principles and methods, and making decisions affecting the measurement of transactions in which objective judgment is required.

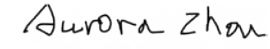
In discharging its responsibilities for the integrity and fairness of the financial statements, management designs and maintains the necessary accounting systems and related internal controls to provide reasonable assurance that transactions are authorized, assets are safeguarded and financial records are properly maintained to provide reliable information for the preparation of financial statements.

The Board of Directors and Finance and Audit Committee are composed entirely of Directors who are neither management nor employees of the Organization. The Board is responsible for overseeing management in the performance of its financial reporting responsibilities, and for approving the financial information. The Finance and Audit Committee has the responsibility of meeting with management and external auditors to discuss the internal controls over the financial reporting process, auditing matters and financial reporting issues. The Finance and Audit Committee is also responsible for recommending the appointment of the Organization's external auditors.

MNP LLP is appointed by the member to audit the financial statements and report directly to them; their report follows. The external auditors have full and free access to, and meet periodically and separately with, both the Finance and Audit Committee and management to discuss their audit findings.



Bill Matiko
Chief Operating Officer



Aurora Zhou
Finance Manager

To the Member of Canadian Light Source Inc.:

Opinion

We have audited the financial statements of Canadian Light Source Inc. (the "Organization"), which comprise the statement of financial position as at March 31, 2022, and the statements of operations, changes in member's surplus and cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Organization as at March 31, 2022, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Organization in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Organization's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Organization or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Organization's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Organization's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Organization's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Organization to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Saskatoon, Saskatchewan

June 22, 2022

MNP LLP

Chartered Professional Accountants

MNP

Canadian Light Source Inc.
STATEMENT OF OPERATIONS
for the year ended March 31
(in thousands of dollars)

	2022	2021
REVENUE		
Canada Foundation for Innovation	**$ 21,311**	$ 18,941
Natural Sciences and Engineering Research Council of Canada	**5,600**	5,600
Canadian Institutes of Health Research	**2,000**	2,000
University of Saskatchewan	**2,240**	2,438
Province of Saskatchewan	**4,100**	4,100
Contracted research fees and other	**1,716**	1,211
	36,967	34,290
EXPENSES		
Salaries and benefits (Note 3)	**25,855**	23,918
Repairs and maintenance (Note 6)	**3,677**	3,599
Supplies and services (Note 13)	**4,730**	3,554
Bad debt expense	**51**	40
Utilities (Note 15)	**3,162**	2,628
Decommissioning costs (Note 14)	**779**	728
	38,254	34,467
OPERATING LOSS	**(1,287)**	(177)
Recognition of deferred contributions related to equipment and facility improvements (Note 11)	**4,885**	5,068
Amortization of equipment, facility improvements and intangible assets	**(5,297)**	(5,566)
NET LOSS BEFORE OTHER ITEMS	**(1,699)**	(675)
OTHER ITEMS		
Construction loss recovery (Note 12)	**1,357**	-
Gain on termination of capital lease (Note 13)	**562**	-
NET EARNINGS (LOSS) FOR THE YEAR	**$ 220**	$ (675)

Canadian Light Source Inc.
STATEMENT OF CHANGES IN MEMBER'S SURPLUS
for the year ended March 31
(in thousands of dollars)

	Unrestricted	Invested in equipment, facility improvements and intangible assets (Note 16)	2022	2021
Balance, beginning of year	$ 6,983	$ 4,532	**$ 11,515**	$ 12,190
Net earnings (loss)	70	150	**220**	(675)
Disposal of equipment and facility improvements	950	(950)	**-**	-
Balance, end of year	$ 8,003	$ 3,732	**$ 11,735**	$ 11,515

Canadian Light Source Inc.
STATEMENT OF FINANCIAL POSITION
as at March 31
(in thousands of dollars)

	2022	2021
CURRENT ASSETS		
Accounts receivable (Note 4 and 15)	**$ 16,616**	$ 13,588
Grants receivable	**2,084**	5,860
Prepaid expenses	**710**	537
Inventory (Note 6)	**4,086**	3,911
	23,496	23,896
PREFERRED SHARES (Note 5)	**-**	-
EQUIPMENT AND FACILITY IMPROVEMENTS (Note 7)	**44,398**	46,026
DECOMMISSIONING FUND (Note 14)	**2,395**	1,366
INTANGIBLE ASSETS (Note 8)	**413**	458
	$ 70,702	$ 71,746
CURRENT LIABILITIES		
Accounts payable and accrued liabilities (Note 9 and 15)	**$ 5,215**	$ 5,348
Government remittances payable	**29**	31
Deferred revenue	**1,921**	1,474
Deferred contributions (Note 10)	**3,388**	3,838
	10,553	10,691
DEFERRED CONTRIBUTIONS RELATED TO EQUIPMENT AND FACILITY IMPROVEMENTS (Note 11)	**36,584**	37,727
OBLIGATION UNDER CAPITAL LEASE (Note 13)	**-**	950
ACCRUED DECOMMISSIONING COSTS (Note 14)	**11,830**	10,863
	58,967	60,231
COMMITMENTS (Note 18)		
MEMBER'S SURPLUS		
Unrestricted	**8,003**	6,983
Invested in equipment, facility improvements and intangible assets (Note 16)	**3,732**	4,532
	11,735	11,515
	$ 70,702	$ 71,746

APPROVED BY THE BOARD OF DIRECTORS

Chair, Board of Directors

Chair, Finance and Audit Committee of the Board of Directors

Canadian Light Source Inc.
STATEMENT OF CASH FLOWS
for the year ended March 31
(in thousands of dollars)

	2022	2021
OPERATING ACTIVITIES		
Net earnings (loss)	**$ 220**	$ (675)
Recognition of deferred contributions related to equipment and facility improvements	**(4,885)**	(5,068)
Amortization of equipment and facility improvements	**5,297**	5,566
Construction loss recovery (Note 12)	**(1,357)**	-
Gain on termination of capital lease (Note 13)	**(562)**	-
Accrued decommissioning costs	**697**	668
	(590)	491
Changes in non-cash working capital		
Accounts receivable	**(3,028)**	6,059
Grants receivable	**3,776**	(3,533)
Prepaid expenses	**(173)**	235
Inventory	**(175)**	(655)
Accounts payable and accrued liabilities	**1,224**	(1,399)
Government remittances payable	**(2)**	(43)
Deferred revenue	**447**	(310)
Deferred contributions	**(450)**	521
	1,029	1,366
INVESTING ACTIVITIES		
Acquisition of equipment and facility improvements	**(3,755)**	(3,552)
Investment in decommissioning fund	**(1,029)**	(1,366)
	(4,784)	(4,918)
FINANCING ACTIVITIES		
Restricted contributions used to purchase equipment and facility improvements	**3,755**	3,552
CASH POSITION, BEGINNING OF THE YEAR	**-**	-
CASH POSITION, END OF THE YEAR	**$ -**	$ -

1. NATURE OF THE ORGANIZATION

Canadian Light Source Inc. (the "Organization") was incorporated under the Non-Profit Corporations Act of Saskatchewan on May 14, 1999 with its sole member being the University of Saskatchewan ("USask").

USask has constructed and licensed its third generation synchrotron light facility (the "facility") to the Organization, which is responsible for the operation and conduct of all activities related to the facility, including the design, installation, and maintenance of all beamlines and related equipment.

The mandate of the Organization is to advance scientific and industrial capabilities in synchrotron science and techniques.

Impact on operations of COVID-19 (coronavirus)

In early March 2020 the global outbreak of COVID-19 (coronavirus) began to have a significant impact on businesses through the restrictions put in place by the Canadian, provincial and municipal governments regarding travel, business operations and isolation/quarantine orders.

The Organization's operations were impacted by COVID-19 by placing the facility into a warm standby mode in the prior year which resulted in a staged return to operating mode. The Organization still has not fully returned to normal operations. In addition, travel costs were significantly reduced, and several capital expenditure projects were delayed.

At this time, it is unknown the extent of the impact the COVID-19 outbreak may have on the Organization as this will depend on future developments that are highly uncertain and that cannot be predicted with confidence. These uncertainties arise from the inability to predict the duration of the outbreak, including the duration of travel restrictions, business closures or disruptions, and quarantine/isolation measures that are currently, or may be put, in place by Canada to fight the virus. While the extent of the impact is unknown, the Organization anticipates this outbreak may cause continued extended periods of shut down, possible delays in capital expenditure projects, supply chain disruptions, and increased regulations from USask and the government, all of which may negatively impact the Organization's operations.

2. SIGNIFICANT ACCOUNTING POLICIES

These financial statements have been prepared in accordance with Accounting Standards for Not-for-Profit Organizations ("ASNPO") and reflect the following significant accounting policies:

Revenue Recognition

The Organization follows the deferral method of accounting for contributions. Contributions from the Canada Foundation for Innovation, Natural Sciences and Engineering Research Council of Canada, and Canadian Institutes of Health Research, and other restricted grants are recognized as revenue in the year in which the related expenses are incurred. Contributions received in excess of expenses incurred are recorded as deferred contributions.

Contributions from USask, the Province of Saskatchewan and other unrestricted contributions are recognized as revenue in the period in which they are received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

Contracted research fees and contractor revenue are recorded as services are rendered. Advances related to construction of additional beamlines and technical equipment in excess of expenses are recorded as deferred revenue. Losses on contracts are recognized as soon as the amount can be reasonably estimated.

Inventory

Inventory is valued at the lower of cost and net realizable value. Cost is determined using the first in, first out method.

2. SIGNIFICANT ACCOUNTING POLICIES (continued)

Equipment, Facility Improvements and Intangible Assets

Equipment and facility improvements are recorded at cost. Assets, with the exception of asset retirement obligations and intangible assets, are amortized over their expected useful life using the declining balance method at the following rates:

Equipment and furnishings	20%
Computer equipment and software	30%
Facility improvements	10%
Building under capital lease	10%

Assets are amortized at one half of the above rates in the year of acquisition.

Asset retirement obligations are amortized on a straight-line basis over the expected remaining operating life of the facility. Intangible assets are amortized on a straight-line basis over the expected useful life to the Organization.

Assets under development are not amortized until they are available for use.

The Organization writes down long lived assets held for use when conditions indicate that the asset no longer contributes to the Organization's ability to provide goods and services. The asset is also written down when the value of future economic benefits or service potential associated with the asset is less than its net carrying amount. When the Organization determines that a long lived asset is impaired, its carrying amount is written down to the asset's fair value.

Decommissioning Costs

The Organization is required to decommission the facility when operations cease in accordance with its Particle Accelerator Operating License issued by the Canadian Nuclear Safety Commission ("CNSC"). The Organization expects the facility to operate for a 25 year period from commencement of operations.

Financial Instruments

The Organization recognizes financial instruments when the Organization becomes party to the contractual provisions of the financial instrument.

Arm's Length Financial Instruments

Financial instruments originated/acquired or issued/assumed in an arm's length transaction ("arm's length financial instruments") are initially recorded at their fair value.

At initial recognition, the Organization may irrevocably elect to subsequently measure any arm's length financial instrument at fair value. The Organization has not made such an election during the year.

The Organization subsequently measures all arm's length financial assets and liabilities at amortized cost.

Transaction costs and financing fees are added to the carrying amount for those financial instruments subsequently measured at cost or amortized cost.

Related Party Financial Instruments

The Organization has no related party financial instruments required to be recognized at fair value.

All other related party financial instruments are measured at cost on initial recognition. When the financial instrument has repayment terms, cost is determined using the undiscounted cash flows, excluding interest, dividend, variable and contingent payments, less any impairment losses previously recognized by the transferor. When the financial instrument does not have repayment terms, but the consideration transferred has repayment terms, cost is determined based on the repayment terms of the consideration transferred. When the financial instrument and the consideration transferred both do not have repayment terms, the cost is equal to the carrying or exchange amount of the consideration transferred or received.

2. SIGNIFICANT ACCOUNTING POLICIES (continued)

The Organization subsequently measures all related party financial instruments using the cost method less any reduction for impairment.

Transaction costs and financing fees directly attributable to the origination, acquisition, issuance or assumption of related party financial instruments are immediately recognized in net earnings (loss).

Financial Asset Impairment

The Organization assesses impairment of all its financial assets measured at cost or amortized cost. The Organization groups assets for impairment testing when there are numerous assets affected by the same factors. Management considers whether the issuer is having significant financial difficulty; or whether there has been a breach in contract, such as a default or delinquency in interest or principal payments in determining whether objective evidence of impairment exists. When there is an indication of impairment, the Organization determines whether it has resulted in a significant adverse change in the expected timing or amount of future cash flows during the year.

The Organization reduces the carrying amount of any impaired financial assets to the highest of: the present value of cash flows expected to be generated by holding the assets; the amount that could be realized by selling the assets at the statement of financial position date; and the amount expected to be realized by exercising any rights to collateral held against those assets.

Any impairment, which is not considered temporary, is included in current year net earnings (loss).

The Organization reverses impairment losses on financial assets when there is a decrease in impairment and the decrease can be objectively related to an event occurring after the impairment loss was recognized. The amount of the reversal is recognized in net earnings (loss) in the year the reversal occurs.

Income Taxes

The Organization is a non-profit entity and is exempt from income taxes.

Deferred Contributions Related to Equipment and Facility Improvements

Deferred contributions related to equipment and facility improvements represent the unamortized portion of restricted contributions that were used to purchase the Organization's equipment and facility enhancements. Recognition of these amounts as revenue is deferred to periods when the related capital assets are amortized.

Defined Contribution Pension Plan

The Organization has a defined contribution pension plan that is offered to permanent employees and employees with a 2 year term or greater. The Organization matches employee contributions.

Foreign Currency Translation

Monetary assets and liabilities denominated in foreign currencies are translated into CAD using the exchange rate in effect at year end. Other assets and liabilities are translated at the prevailing historical rates at the time of the transaction. Expenses arising from foreign currency transactions are translated at the exchange rates in effect on the transaction date. Unrealized exchange gains and losses are included in the determination of net earnings or loss for the year. The Organization does not enter into any derivative contracts to hedge its exposure to changes in foreign currency exchange rates.

Use of Estimates

The preparation of the financial statements in conformity with ASNPO requires management to make estimates and assumptions that affect reported amounts of assets, liabilities and disclosures of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the year.

Significant financial statement items that require estimates include the collectability of accounts receivable and loan receivable, the impairment of preferred shares, the useful life, discount rates and future costs associated with the asset retirement obligation, the estimate of project overrun costs on contracts, the useful life and potential impairment of equipment, facility improvements and intangible assets and potential contingencies. Actual results could differ from those estimates.

(in thousands of dollars)

3. DEFINED CONTRIBUTION PENSION PLAN

Total pension contributions made by the Organization in the year totaled $1,453 (2021 – $1,331) and are included in salaries and benefits in the Statement of Operations.

4. ACCOUNTS RECEIVABLE

	2022	2021
Cash held by U of S (Note 15)	**$ 15,710**	$ 9,090
Trade accounts receivable	**582**	471
Construction revenue receivable	**259**	3,869
Other	**139**	181
Allowance for doubtful accounts	**(74)**	(23)
	$ 16,616	$ 13,588

5. PREFERRED SHARES

The Organization had a loan agreement to finance Canadian Isotope Innovations Corporation (CIIC) for a total amount of $5,260 at March 31, 2020. At March 31, 2020, the Organization had determined that there was an uncertainty regarding the collectability of the amounts advanced due to start up delays in the project and therefore recognized a full impairment of the loan receivable.

On April 30, 2020, the Organization exchanged the loan receivable and account receivable from CIIC for preferred shares from CIIC with a face value of $6,321. The shares are redeemable by CIIC, are retractable by the Organization after December 31, 2024 and are non-voting. The shares bear a cumulative dividend at a rate equal to the lesser of the average prime rate plus 0.5% and 7.0% commencing January 1, 2024. The shares have been recorded at a fair market value of $ nil (2021 – $ nil).

6. INVENTORY

The Organization holds spare parts in stock at year end. The Organization recognized $257 (2021 – $680) of inventories as expense during the year.

7. EQUIPMENT AND FACILITY IMPROVEMENTS

	Cost	Accumulated Amortization	Net Book Value 2022	Net Book Value 2021
Equipment and furnishings	$ 12,863	$ 8,589	**$ 4,274**	$ 4,240
Computer equipment and software	15,880	12,154	**3,726**	3,728
Facility improvements	59,633	32,216	**27,417**	29,529
Building under capital lease	-	-	**-**	388
Asset retirement obligations	8,709	4,214	**4,495**	4,225
Development in progress	4,486	-	**4,486**	3,916
	$ 101,571	$ 57,173	**$ 44,398**	$ 46,026

(in thousands of dollars)

8. INTANGIBLE ASSETS

	Cost	Accumulated Amortization	Net Book Value 2022	Net Book Value 2021
Intellectual property	$ 639	$ 226	**$ 413**	$ 458

9. ACCOUNTS PAYABLE AND ACCRUED LIABILITIES

	2022	2021
Trade accounts payable	**$ 961**	$ 236
Accrued loss on construction	**636**	1,879
Accrued vacation payable	**2,455**	2,224
Other accrued liabilities	**1,163**	1,009
	$ 5,215	$ 5,348

10. DEFERRED CONTRIBUTIONS

	2022	2021
BEGINNING OF YEAR	**$ 3,838**	$ 3,317
Contributions received / receivable in year	**32,219**	30,888
Recognized as revenue	**(28,914)**	(26,815)
Contributions used for purchase of equipment and facility improvements	**(3,755)**	(3,552)
END OF YEAR	**$ 3,388**	$ 3,838

11. DEFERRED CONTRIBUTIONS RELATED TO EQUIPMENT AND FACILITY IMPROVEMENTS

	2022	2021
BEGINNING OF YEAR	**$ 37,727**	$ 39,602
Contributions for purchase of equipment and facility improvements	**3,755**	3,552
Disposals in the year	**(13)**	(359)
Recognized as revenue	**(4,885)**	(5,068)
END OF YEAR	**$ 36,584**	$ 37,727

12. CONTRACTOR REVENUE

The Organization is party to an agreement to design and construct additional beamlines for the facility (Note 15). The Organization has recorded contractor revenues of $1,012 (2021 – $2,238) net of costs of the same amount.

During the year, the Organization recovered previously recognized expected losses related to active construction contracts of $1,357 (2021 – $ nil) due to the completion of the construction projects below the previously estimated losses and revised estimates for active projects.

(in thousands of dollars)

13. OBLIGATION UNDER CAPITAL LEASE

The Organization entered into a capital lease with USask for the use of a building to be used as a user residence. The lease term was 20 years, commencing July 1, 2012, with the lease payments consisting of interest only for the first 10 years. The interest rate is based on the internal loan rate of USask (currently 3%). Interest expense in the period is $17 (2021 – $29).

During the year, USask provided the Organization with notice of termination of the lease after a flood damaged the building. USask terminated the lease on December 17, 2021. This resulted in a gain on termination of the capital lease of $562.

14. ACCRUED DECOMMISSIONING COSTS

The Organization anticipates the undiscounted future cash flows required to decommission the facility to be $13,986 (2021 – $12,287). The present value of the asset retirement obligation and the liability for decommissioning costs has been calculated using a credit-adjusted risk free interest rate of 2.4% (2021 – 1.6%) and an inflation rate estimate of 2.1% (2021 – 1.1%). The change in the rate estimate resulted in an increase of $799 to both the accrued decommissioning costs and the asset retirement obligations. The current year decommissioning costs of $779 (2021 – $728) include amortization of asset retirement obligations of $528 (2021 – $524) and costs associated with a financial guarantee to the CNSC of $83 (2021 – $59). The financial guarantee is in the amount of $10,549 (2021 – $10,549).

During the year, the Organization set aside funds for the purpose of funding the decommissioning liability of $950 (2021 – $1,350). At the end of the year, the balance of these funds is $2,395 (2021 – $1,366), which includes interest earned on the funds.

A reconciliation of the accrued decommissioning costs is as follows:

	2022	2021
BEGINNING OF YEAR	**$ 10,863**	$ 10,682
Accretion expense	**168**	145
Adjustment due to change in cost estimate	**799**	36
END OF YEAR	**$ 11,830**	$ 10,863

15. RELATED PARTY TRANSACTIONS

The Organization has recorded contractor revenues for construction of beamlines for USask of $1,012 (2021 - $2,238) net of costs of the same amount.

Under the terms of a License Agreement with USask, whereby the Organization has assumed responsibility for the operation, maintenance and enhancement of the facility, the Organization is committed to pay a license fee including utility costs. During the year, the amount of the license fee and utilities expensed by the Organization was $3,254 (2021 – $2,722).

During the year, the Organization purchased goods and services from USask in the amount of $1,001 (2021 – $944).

The financial guarantee to the CNSC for the decommissioning of the facility of $10,549 (2021 – $10,549) was obtained by USask on behalf of CLSI. The costs associated with the financial guarantee of $83 (2021 – $59) have been paid by CLSI.

All funds received by the Organization are held in, and payments to vendors of the Organization are made from, bank accounts administered by USask. At the end of the year, the amounts due from/(to) USask are as follows:

	2022	2021
Due from - cash on hand	**$ 15,710**	$ 9,090
Due from - grant funds received and not advanced	**356**	5,766
Due from - goods and services provided	**246**	238
Due (to) from - beamline construction	**(1,646)**	2,399
Due to - goods and services purchased	**(2)**	(16)

(in thousands of dollars)

15. RELATED PARTY TRANSACTIONS (continued)

Routine operating transactions with USask are settled at prevailing market prices under normal trade terms.

Accounts receivable includes housing loans receivable from management of $ nil (2021 - $61).

These transactions are in the normal course of operations and are measured at the exchange amount, which is the amount of consideration established and agreed to by the related parties.

16. MEMBER'S SURPLUS INVESTED IN EQUIPMENT, FACILITY IMPROVEMENTS AND INTANGIBLE ASSETS

As indicated in the Statement of Changes in Member's Surplus, the Organization has made significant investments in equipment, facility improvements and intangible assets. These represent strategic investments by the Organization that cannot be funded from specific grants. These investments have been approved by the Board of Directors. The amortized investment of these equipment, facility improvement and intangible asset investments are as follows:

	2022	2021
Facility improvements - beamlines	**$ 1,521**	$ 1,691
Facility improvements - medical isotope technology	**702**	776
Intangible asset - intellectual property	**413**	458
Facility improvements - office expansion	**763**	848
Improvements to leased building	**-**	388
Other	**333**	371
Member's surplus invested in equipment, facility improvements and intangible assets	**$ 3,732**	$ 4,532

17. FINANCIAL INSTRUMENTS

The Organization is exposed to various risks through its financial instruments. The following analysis presents the Organization's exposures to risks at the reporting date.

Credit risk

The Organization is exposed to credit risk with respect to accounts receivable, grants receivable, decommissioning fund, and preferred shares. Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. The Organization assesses credit risk on a continuous basis and to mitigate this risk, it maintains an allowance for doubtful accounts and has recognized a full impairment of preferred shares.

Currency risk

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

The Organization does not actively manage this risk.

The accounts payable and accrued liabilities includes the following amounts expressed in CAD with respect to financial liabilities for which cash flows are denominated in foreign currencies:

	2022	2021
Accounts payable - USD	**$ 78**	$ 56
Accounts payable - Euro	**75**	-
	153	$ 56

(in thousands of dollars)

17. FINANCIAL INSTRUMENTS (continued)

Liquidity risk

Liquidity risk is the risk that the Organization will not be able to meet the obligations associated with its financial liabilities. The Organization is exposed to this risk mainly in respect to its accounts payable and accrued liabilities and accrued decommissioning costs. To manage this risk, the Organization generates cash flows from operations which is monitored on a continuous basis.

18. COMMITMENTS

At the end of the year, the Organization had future commitments of $3,603 (2021 – $3,790).

	2022	2021
Salaries and benefits	**$ 166**	$ 464
Supplies and services	**1,168**	1,072
Maintenance	**767**	312
Equipment and facility improvements	**1,502**	1,942
	$ 3,603	$ 3,790

19. COMPARATIVE FIGURES

Certain comparative figures have been reclassified to conform with current year presentation.

Thank **You**

Thank you to our government, academic and corporate funding partners for their investment in Canadian science and discovery.

OPERATING

CAPITAL

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The Canadian Light Source is a national research facility of the University of Saskatchewan.

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