ADVANCING HUMAN AND SOCIETAL HEALTH AND WELL-BEING

At McMaster, we are devoted to the cultivation of human potential.

We are committed to taking a collaborative approach to improving people’s lives, contributing to global knowledge and finding creative solutions to some of our most complex challenges.

One of the ways we fulfill this commitment is by pioneering groundbreaking research in fields ranging from health care to business, arts and culture to advanced manufacturing. We’re empowering the next generation to create a Brighter World.
How our COVID work connects with the SDGs

Global Nexus for Pandemics and Biological Threats

McMaster launched the Global Nexus for Pandemics and Biological Threats to ensure Canada and the world are better able to manage the human and economic devastation of COVID-19 and avert future pandemics. Since the pandemic began, McMaster researchers across diverse fields of expertise have rapidly mobilized to deliver on more than 100 COVID-19-related research projects, leveraging vast international networks. Global Nexus, led by McMaster researchers from many disciplines, will be an international network of scientists, clinical health and medical specialists, engineers, social scientists, history and policy researchers, and business and economics researchers devoted to one goal: preventing future pandemics and mitigating global health threats like antimicrobial resistance. The innovative network quickly garnered international attention, as well as government and philanthropic support, for its approach in its first few months.

Centre of Excellence in Protective Equipment and Materials (CEPEM)

A team of engineers, scientists and manufacturers from private industry and McMaster University successfully created the first N95 respirator made and approved for sale in Canada — one of the many success stories stemming from the university’s Centre of Excellence in Protective Equipment and Materials (CEPEM). Launched early in the pandemic to build expertise in supporting domestic supply chains for PPE, the team has worked with more than 50 companies from across Canada. The centre is quickly establishing itself as an innovative partner to a growing number of companies being set up in Canada to design and develop PPE, providing assistance in testing and developing advanced technology.

Wastewater surveillance initiative to detect COVID-19

Researchers at McMaster University are ramping up a wastewater testing program designed to quickly detect and track COVID-19 in raw sewage which could serve as an early warning sign for current outbreaks and future pandemics. While existing clinical tests can identify affected individuals with precision, wastewater testing is a cost-efficient and quick means to identify the virus and can be narrowed down to specific neighborhoods and communities. The project is part of a broader provincial initiative called the COVID-19 Wastewater Consortium of Ontario (CWCO), in which researchers plan to help equip local facilities to detect COVID-19 earlier and more effectively, measure the effectiveness of future vaccines, and expand the scope of detectable harmful pathogens.

Researchers play key role in isolating COVID-19 virus for use in urgent research

The COVID-19 pandemic continues to spread worldwide, yet much remains unknown about SARS-CoV-2, the coronavirus that causes COVID-19. Researchers at McMaster’s Institute for Infectious Disease Research and the David Braley Centre for Antibiotic Discovery played a critical role on a small team that successfully isolated and propagated the virus, which is believed to have jumped from bats to humans. The work has enabled urgent Canadian research into how the virus behaves and how it might be controlled. Researchers have since shared the isolated virus stock with research institutions across the country which has aided and supported research and development of COVID-19 diagnostics and therapies.

Economists leading several studies on staffing and care for seniors

Canada’s long-term care sector has been especially hard hit by the COVID-19 pandemic, with devastating effects in many homes where vulnerable seniors and front-line health care workers bore the brunt of the crisis. Economists at McMaster are conducting several studies related to long-term care in Ontario, including an expert report submitted to the provincial government, calling for increased funding and the creation of more permanent, full-time positions. Other research projects address the need to create appropriately funded evidence-based policies and practices to support health-care workers and health systems in coping with the significant burdens posed by the pandemic.

Saliva-based, asymptomatic testing could limit spread of COVID-19

A team of experts in immunology, infectious diseases, biomedical engineering and evolutionary genetics is studying saliva-based testing procedures that would enable routine testing of asymptomatic individuals on a large scale. Worldwide, COVID-19 testing has been plagued by shortages of testing kits and materials, as well as a lack of capacity in clinical testing facilities. Researchers believe the development and implementation of high-capacity testing procedures — which could be done in university labs — would enable large-scale and routine testing to better identify cases, isolate infected individuals and limit the spread of COVID-19. Hundreds of volunteers will be tested using a protocol where participants simply provide a small amount of saliva in a sample tube. Researchers are also conducting serology tests, which identify antibodies in the blood, to measure the incidence of false-negative and false-positive results of the saliva tests.

McMaster Health Forum

The McMaster Health Forum, a leading international collaborating centre focused on health and social systems evidence, has developed COVID-19 Evidence Network to support Decision-making (COVID-EN). a new resource to help leaders and policymakers as they respond to unprecedented challenges related to the COVID-19 pandemic. This network brings together more than 50 of the world’s leading evidence-synthesis, technology-assessment, and guideline-development groups. It also covers the full spectrum of contexts where the pandemic response is playing out, including low-, middle- and high-income countries.
The burden of precarious employment

Poverty is more than the lack of income and resources to live one day to the next. It means hunger and malnutrition, sub-standard housing, limited access to education and social discrimination. The Poverty and Employment Precarity in Southern Ontario research project is a joint university-community initiative led by McMaster University and United Way Toronto & York Region in partnership with more than 30 university, community sector, labour, government and media partners. Its goal has been to gather data on trends in precarious employment and to encourage policy debate and further research. PEPSO has influenced key policy decisions, expanded existing knowledge and served as a foundation for further research.

Working together

McMaster is a partner in the International Association of Universities (IAU) Cluster on Higher Education and Research for Sustainable Development, which promotes the role institutions around the world must play in achieving the SDGs and Agenda 2030. The Cluster works on all dimensions of the SDGs, combining economic, social, cultural and environmental sustainability. Led by the University of Ghana, McMaster is focusing on SDG 1 (No Poverty).

Policy made for real people

The McMaster Community Poverty Initiative brings together faculty, students and staff not just with community groups, but also with people living in poverty. It ensures policy development is fully informed by people with firsthand knowledge about what it means to be poor and to live in Hamilton. As a partner with Living Wage Hamilton, MCPI advocates for a minimum wage that allows workers to earn enough to pull themselves and their families out of poverty, which affects health, education levels and the community’s economic prosperity.

Food to warm the heart

The student-run Food Collective Centre is dedicated to ensuring that food is always accessible to support food-insecure individuals. Its goals include cultivating stronger food systems on campus and in the surrounding community, and advocating for practices to improve food security.

End poverty in all its forms everywhere.

Money for those who need it most

The McMaster Students Union successfully advocated for the university to lower the barriers for low-income and struggling students by diverting $250,000 from merit-based scholarships to needs-based aid. All McMaster bursaries — non-repayable funds used for such things as tuition, books, living expenses and special equipment — are based solely on financial need. In 2018-2019, McMaster’s students received about $6.2 million in bursaries.

Help in extremis

When all other avenues have been exhausted, the university provides emergency financial support to students in need — including those facing a lack of funds for basic living expenses or required technology for courses, pending eviction and negative circumstances beyond their control.

THE NUMBER OF PEOPLE LIVING IN POVERTY IN HAMILTON IS AT ITS LOWEST POINT IN THE LAST 15 YEARS.

“I don’t think we realize that poverty can impact people in every single facet of their lives, especially when it comes to their health.”

– Gina Agarwal, Community Paramedicine at Clinic

End poverty in all its forms everywhere.

Medical aid where it’s needed

Health conditions that come with age coupled with poverty often lead to more trips to the emergency room, and more calls to 911. A team of researchers at McMaster University’s Department of Family Medicine developed Community Paramedicine at Clinic — CP@Clinic — which sees paramedics hold drop-in sessions in social housing locations where seniors live, assessing risks and providing tailored education. The result? A decrease in 911 calls, strengthened connections with primary health-care providers and improved quality of life for patients. Health Canada has funded a national expansion of the service.

A roof over your head

Finding affordable housing on a limited income can be an almost unsurmountable challenge. The Symbiosis initiative through the Graduate Studies program connects students in need of low-cost or no-cost housing — in exchange for modest help around the house — with seniors who have a spare room and could benefit from extra support and companionship. Both parties are matched, sign agreements and Symbiosis follows up to ensure the cohabitation is harmonious.

Food to warm the heart

No one should have to decide between paying the hydro bill, buying a warm coat and boots for winter, or eating three meals a day. Or two. Or one. The student-run Food Collective Centre is dedicated to ensuring that food is always accessible to support food-insecure individuals. Its goals include cultivating stronger food systems on campus and in the surrounding community, and advocating for practices to improve food security.

14,000

NUMBER OF JOBS CREATED AS A RESULT OF McMaster’S ANNUAL OPERATING EXPENDITURES IN THE ECONOMY

$3.87 billion

ANNUAL ECONOMIC IMPACT ON HAMILTON’S GDP

1 - no poverty

ANNUAL ECONOMIC IMPACT ON HAMILTON’S GDP

14,000

NUMBER OF JOBS CREATED AS A RESULT OF McMaster’S ANNUAL OPERATING EXPENDITURES IN THE ECONOMY
End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

Let it grow

The community engagement component of the School of Interdisciplinary Science brings together students, faculty and community partners. Past projects include the McMaster Teaching & Community Garden, designed to facilitate local food production alongside teaching and learning opportunities; nutrition workshops for Hamilton seniors; creation of a permaculture garden to explore sustainable agriculture; and a partnership with the United Way to create an urban farm for experiential learning.

Hungry minds

The student-run Food Collective Centre, the university’s on-campus food bank, offers a number of supports for students, staff, alumni and Hamilton community partners. The collective advocates for practices to improve food security and is dedicated to ensuring food is always available. It offers programs such as the monthly Good Food Box, filled with affordable, fresh produce, and Lockers of Love, a confidential way to request and receive non-perishable food items and health supplies.

Moving beyond charity

Hamilton Community Food Centre (HCFC), a project of the Neighbour to Neighbour Centre (N2N), offers food-based programs that bring everyone together to grow, cook, share and advocate for good food. Researcher Tina Moffat received funding to evaluate the youth food programming at the HCFC, part of a growing movement of food centres across Canada that move beyond charity models of food banks to give food-insecure populations access to nutritious food in a dignified manner.

It’s no game

Cards for Humanity is a pay-it-forward initiative to increase access to meals on campus for students with financial concerns and limitations. Students are encouraged to use the cards for purchases at Bridges, an on-campus café, and pay a little extra when they can to help someone else.

Understanding the problem

The McMaster University Centre for Climate Change studies, among other things, the impact human activities have on the environment. Crop failures and diminishing yields due to weather events can put food security at risk. Water scarcity caused by climate change could lead to wide-scale famine. At the other end of the spectrum, flooding may contaminate food and water sources. Research into the societal impact of climate change provides the necessary information to understand the challenge and develop solutions.
Ensure healthy lives and promote well-being for all at all ages.

**McMaster and the world**

The UN Sustainable Development Goals are fundamental to the work of McMaster’s Global Health Office, which connects researchers, educators, students and clinicians with global development organizations and funding agencies. For the last decade, the Global Health Office has formed partnerships with institutions and governments in developing countries – advancing the education of women health professionals in Pakistan, improving the health of vulnerable people in Indonesia, and increasing access to health education in underserved communities in the High North regions of Canada and Norway. Educational partnerships for the Doctoral and Master of Science in Global Health span five continents; examples of research areas include data science, health equity, pandemic planning and infectious disease, and refugee health and humanitarian crises.

**Health through knowledge**

The Population Health Research Institute, founded by McMaster and Hamilton Health Sciences, is a global health institute and world leader in large clinical trials and population studies. An international network of almost 400 scientists, investigators and research fellows work together to address global health challenges such as cardiovascular disease, poverty-related infectious disease and under-nutrition, Type-2 diabetes, stroke and cognitive decline. To date, more than 1.5 million people have participated in studies in 102 countries.

**HELP IS HERE**

The Student Wellness Centre is the go-to hub for counselling, education and many other supports for students. The peer-run Student Health Education Centre offers referrals to on- and off-campus resources, including those providing free health care and sexual health information and services. As well, a wide range of student groups, centres and networks are in place to help specific communities within the university, such as the Pride Community Centre and the Women and Gender Equity Network.

**Information is power**

The McMaster Health Forum is a leading international collaborating centre that works to ensure health systems around the world are strengthened by evidence-informed policymaking. Active for a decade, the forum recently broadened its focus to include social systems and the Sustainable Development Goals. Its 21-plus partners include the World Health Organization, the PanAmerican Health Organization and departments at all levels of government. Its free, searchable databases — Health Systems Evidence and Social Systems Evidence — are the most comprehensive access points for policymakers, researchers and stakeholders seeking evidence on a wide range of issues, accessed by 13,500 registered users globally.

**INDIGENOUS CONNECTIONS**

The Indigenous Health Initiative in the Faculty of Health Sciences advocates for meaningful change in the health system to ensure that Indigenous community members receive health care that is culturally safe. It strives to educate doctors, nurses and other healthcare professionals to respect Indigenous ways of knowing about health and well-being. The university also offers Indigenous-specific support, advocacy and access programming on campus and in the broader community through Indigenous Student Services. There is a ceremonial space, a counselor and Elders, recreation, workshops, and self-care and mental wellness services geared to Indigenous students.

**THE SCIENCE OF AGING**

The McMaster Institute for Research on Aging seeks to address the complex issues facing an aging population worldwide, while working to engage the older adult community, their families, healthcare providers and other key stakeholders to optimize the health and longevity of the aging population. These efforts include making the university more accessible to seniors and practical solutions to reduce the social isolation experienced by older members of the community. McMaster Optimal Aging Portal provides an internationally available information-sharing resource for citizens, clinicians, healthcare professionals and policymakers on aging, offering the latest scientific evidence on aging and health-care topics for seniors.

**CLOSE TO HOME**

McMaster’s strong community ties can be seen in such projects as CityLAB Hamilton, a partnership with the city that identifies ways to improve life in the city, such as encouraging international graduates to make Hamilton their home and welcoming art in public spaces; the McMaster Student Outreach Collaborative, which helps those who are marginally housed, homeless or at risk of homelessness; and the outreach initiative McMaster Children & Youth University delivers programming for young people aged seven to 14 through free lectures from professors and workshops facilitated by students.

**GOOD HEALTH AND WELL-BEING**

11th IN THE WORLD FOR CLINICAL AND HEALTH PROGRAMS (TIMES HIGHER EDUCATION)

6th IN THE WORLD IN TIMES HIGHER EDUCATION’S IMPACT RANKINGS FOR SDG 3. NUMBER 1 IN CANADA.
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

**Full STEAM ahead**

The McMaster Children & Youth University delivers free programming for children and youth aged seven to 14 in all areas of science, technology, engineering, arts and math (STEAM). The programs — which includes a family lecture series, workshops and online activities — are intended to share McMaster research in a way that is fun and accessible to all children and youth. The goal is to empower and academically prepare young people, especially those at a socioeconomic disadvantage, to aspire to a university education. MCYU also works to deepen the university’s relationships with schools and organizations in neighbourhoods where high school completion rates are disproportionately low.

**Sustainable goals**

The Academic Sustainability Programs Office oversees the SUSTAIN courses, a suite of five undergraduate courses open to students in all faculties, and offers an Interdisciplinary Minor in Sustainability, with more than 70 courses to choose from. It also operates the Sustainability Internship Program, which allows students to focus on a real-world sustainability project for a course credit.

**Coding is cool**

Software: Tool For Change is dedicated to teaching elementary and middle school students math skills through coding in a fun and safe environment. Lessons incorporate mathematical concepts such as the cartesian coordinate system and trigonometry. The project offers free lessons, activities, tools, teaching videos, class visits and some fee-based tutoring and camps. Volunteers include McMaster undergrads as well as Jr. Mentors in Grades 5 to 8.

**Learning and listening later in life**

Older adults can take advantage of many learning opportunities at McMaster. Those 60 years and older — providing they meet admission and prerequisite requirements — may enroll in tuition-free for-credit courses, only paying an application fee. Enrolling as a listener is an option for those who wish to take a course for the joy of learning, but not for credit. McMaster Learning for 55+ offers an affordable lineup of classes geared to this age group, with topics such as arts and literature, science and technology, health, wellness, and business and innovation. The university is also a member of the Age Friendly University network, a global body comprised of higher-education institutions committed to becoming universally accessible.

**Tools for success**

The made-at-McMaster Archway program partners all first-year students with a coach and mentor to provide proactive guidance based on their goals, interests and needs, providing a supportive virtual community during semesters online. The Student Success Centre is the go-to resource for programs, services and events to help all students achieve their academic, personal and professional goals. It’s where students connect with support for online learning, writing, tutoring and skills development. As part of its International Student Services section, the centre hosts orientation and social events intended to help newcomers adjust to life in Canada.

**Accessing university-level studies**

McMaster enjoys a strong, longstanding partnership with Six Nations Polytechnic, including the SNP-University Consortium Agreement. Under the agreement, McMaster and five other universities offer credit courses for the first year of a general BA in the Six Nations community, which are then transferrable to any of the participating universities. The program is intended to improve education completion and employment opportunities, as well as support community control of postsecondary education. Since its inception, more than 250 students in the program have successfully completed their undergraduate degrees. In a further expansion of opportunities, students at a partner college who complete two years of Indigenous-focused courses may continue their education at McMaster for two years to earn an Honours BA in Indigenous Studies in addition to their college diploma.

“*It is my hope that a spark is born in this class that stays with them wherever they end up.*”

— Vanessa Watts

Indigenous Studies
Achieve gender equality and empower all women and girls.

The McMaster family
Several made-at-McMaster programs allow faculty to take leave without significant financial or career repercussions, such as the Life Events Support Program, which helps mitigate the impact of various leaves (parental, family medical) on research productivity. The university offers numerous child care options: the Child Care Centre run by the students’ union, open to the young children of undergraduate and graduate students, as well as the community at large; the on-campus McMaster Children’s Centre; and free child care to participants in the McMaster Discovery Program, open to members of the public whose circumstances have not allowed them to benefit from a university education.

Female undergrads outnumber male undergrads
At McMaster, admissions are based on academic performance, not gender. In recent years, the number of female undergraduates has outnumbered male undergraduates, according to the McMaster University Fact Book. For example, 54 per cent of undergrads in 2018-19 identified as female, compared to 45 per cent as male. The university has a number of programs that actively recruit female students, particularly in STEM and areas that have traditionally seen lower female enrolment.

Inclusion and collegiality
Through its Equity and Inclusion Office, the university seeks to foster an environment of inclusion and collegiality that goes beyond non-discrimination and harassment policies. In partnership with Pride at Work Canada, the university celebrates all employees, regardless of gender expression, gender identity and sexual orientation. McMaster’s gender-neutral washrooms are open to all on campus and Rainbow and Transgender Pride crosswalks at the main entrance reinforce the importance of making visible and validating the lives of LGBTQ2SI+ community members.

Engineering change
One of the Faculty of Engineering’s strategic goals is to inspire young women to pursue careers in the field. It’s working. In 2019-2020, 35 per cent of first-year Engineering students identified as women, a 15.5 per-cent increase over the last five years. A number of initiatives have sent a ripple of change through the faculty, including shifting hiring practices to increase diversity and sharing the success stories of female students, staff and faculty. The relatively new Integrated Biomedical Engineering & Health Sciences Degree has been of specific interest to female students.

Dollars and sense
Female students can tap into a variety of financial aid, free programs, scholarships and bursaries designed to help women succeed. In the 2017-18 fiscal year, more than 55 per cent of scholarships and grants were given to female students, and more than 52 per cent of the university’s bursaries went to female students. Scholarships aid Indigenous women, females studying engineering and business, and those who show community leadership.

It’s who you know
Mentoring and supports bolster the success of women on campus — staff, academics and students at all levels. Some are formalized programs, while others are less structured, as best suits the needs of the individual. These include job shadowing with industry leaders, women in leadership conferences, female-centric associations, the DeGroote Women’s Professional Network and the McMaster Women in Science and Engineering (WISE) Initiative.

STEM champions
McMaster hosts many programs, initiatives and activities to encourage young women to consider careers in the STEM fields — Science, Technology, Engineering and Math — such as the Girls in Science Day. The Faculty of Engineering offers summer camps, STEM Girls Clubs for elementary students, conferences such as Go ENG Girl and Go CODE Girl for female high school students, and other outreach efforts.

Targeted programming
The DeGroote School of Business’s focus on offering programs that appeal to women has produced an uptick in the number of female students considering business studies and careers. In 2018-19, 69 per cent of the students in the Integrated Business & Humanities program were women; 74 per cent of students in the Master of Finance program were women.

We aim to support, celebrate and advocate for diversity and equity at McMaster University and in our surrounding community.

Juliet Daniel was honoured with a Harry Jerome Award from the Black Business and Professional Association.

70% of The Management Group at McMaster are women
55% of undergraduates are women
35% of first-year students in engineering are women, surpassing Engineers Canada goal
74% of students in Integrated Business & Humanities program are women
74% of students in Integrated Business & Humanities program are women
35% of first-year students in engineering are women, surpassing Engineers Canada goal

BRIGHTER WORLD
BRIGHTER WORLD
McMaster University Sustainable Development Goals Report | 2020
McMaster University Sustainable Development Goals Report | 2020
Ensure availability and sustainable management of water and sanitation for all.

Water conservation on campus
The university’s water consumption has seen a steady decline of more than 61 per cent per student per year from 2002 to 2018. Moreover, further minimizing water usage is a priority of McMaster’s Energy Management Plan (2018). This has involved changing to chilled water loops for cooling equipment, adopting best practices with the goal of reducing potable water consumption in McMaster’s fish research labs by 80 to 95 per cent and installing ultra low-flush urinals and low-flow plumbing in some existing buildings and all future construction.

Water Without Borders
Why do almost a billion people go without daily access to safe water? How does climate change affect water-borne illness? And why does half the world’s population go without adequate sanitation? The Water Without Borders program at McMaster seeks to answer these questions and more.

Look to the skies
Rainwater collection systems on campus reduce the university’s reliance on municipal water systems, storing the collected water in cisterns. The water is filtered and disinfected for use for both drinking and non-drinking purposes. The Engineering Technology Building was designed to reflect the faculty’s strategic plan, Engineering a Sustainable Future, and features rainwater harvesting for wastewater flushing and landscape irrigation.

In the community
McMaster spreads the word about good water management in a number of ways. McMaster Water Week celebrates water and related research in a community fair atmosphere that hosts area organizations in a variety of fields. The Rock Garden in the Royal Botanical Gardens incorporates best practices in sustainable garden design and management, including pollinator-friendly species and drought-tolerant perennials that require less water.

Savings in the rain
According to the Facility Services Energy Management Plan (May 2020), 20 irrigation systems operate on campus based on a schedule — not the most efficient way to operate, if the system waters the grounds while it’s raining. A pilot project involving a 10-acre field used an advanced control system that tracks weather data to make adjustments to the schedule as needed. Thus far, the results have been promising.

A closer look
The McMaster Centre for Climate Change studies water resources and hydroclimate — vital research, considering the availability of fresh, clean water is expected to decline due to climate change. The Spencer Creek Watershed adjacent to campus offers a living laboratory for McMaster researchers to collect data and better understand how land use affects drinking water quality, lake health and biological ecosystems, from the creek to Hamilton Harbour and out into the Great Lakes.

Water of life
Water is necessary to all forms of life, and has been recognized by the United Nations as a fundamental human right that affects everything from physical and mental health to peace and security. As the home of the United Nations University — Institute for Water, Environment and Health, McMaster plays a crucial role in resolving water problems and ensuring all have access to this vital resource.

Have a drink
More than 100 water stations on campus provide free, clean drinking water to students, staff, faculty and visitors. It’s estimated that between 2010 and 2018, the water stations reduced the use of plastic bottles by 10 million.

6,000 HOMES AND COMMUNITY BUILDINGS AFFECTED BY LONG-TERM DRINKING WATER ADVISORIES IN INDIGENOUS COMMUNITIES

The availability of fresh, clean drinking water is expected to decline with future climate change, and we can expect this to be the number one climate issue in the 21st century.
“Our story is an example of how effective NSERC has been in empowering partnerships between academia and the private sector.”

— Ali Emadi
McMaster Automotive Resource Centre (MARC)

Ensure access to affordable, reliable, sustainable and modern energy.

A multidisciplinary approach

The mission of the McMaster Institute for Energy Studies emphasizes the economic and environmental impacts of all stages in the energy process. MIES researchers come from the sciences, engineering, social sciences and business administration. Its areas of study include the development of semiconductor nanowires for solar energy, combining nanotechnology, photonics and energy technology; affordably reducing the noise and vibration performance of vertical axis wind turbines for deployment in urban areas; increasing the power output of nuclear reactors, which will be used for electricity generation in Canada for decades to come; and fuel cells, the bridge to storing all the power produced by the sun and wind.

Driven by the sun

The McMaster Solar Car Project builds and races electric vehicles powered by the sun. Started by students, built by students and led by students, the project’s driving force is to create one of the most eco-friendly vehicles possible and turn climate change around. Team members have built seven cars since the project’s inception in 1997, competing against other top universities around the world. The eighth vehicle is the Arc-Avenger.

Leading the charge

The university has a fleet of 13 electric vehicles as well as free charging stations, but those may need to change, if research in the Department of Electrical & Computer Engineering eliminates some of the challenges related to recharging batteries in electric and autonomous vehicles. How about high-power wireless and ultrafast chargers in a drive-thru charging station? First a prototype, then some industrial partners. Then, who knows?

Increasing the yield

Global energy demands are expected to double in the next 20 years, while the world struggles to reduce greenhouse gas emissions. The need to get every joule possible from renewable energy sources is clear. One tool may be advances in high-power conversion systems, as researched in the Department of Electrical & Computer Engineering. Even small improvements in efficiency can reap significant rewards when dealing with large-scale wind or solar farms — and potentially lower costs.

Testing the grid

Producing sustainable, clean energy from solar panels and wind turbines is part of the solution. The Smart Grid Engineering Lab lets future engineers study how that energy — often produced at different ranges than current methods — can be fed into existing power grids safely and efficiently without overwhelming the system. At the other end of the grid, the state-of-the-art facility can help determine how to best address the energy demands of electric cars and other emerging technology.

Powering up credentials

The undergraduate Power and Energy Engineering Technology program is all about power — power quality, protection and control; energy management; and renewable energy technologies such as biomass, fuel cells, geothermal, solar and wind. This unique diploma-to-degree program is made for college graduates who wish to power up their education to the next level, as all qualified applicants receive two years’ worth of advanced credit from their previously completed college diploma or university degree.

Big wheels keep on charging

Diesel doesn’t just keep the wheels turning on transport trucks: it’s used to power a generator for electrical components such as a truck’s lift gate and refrigeration unit — and powering one refrigeration unit with diesel produces as much carbon dioxide as seven passenger cars. A team of Master’s students from the W. Booth School of Engineering Practice and Technology worked with Westhill Innovation to design a light, modular, easy-to-install system of solar panels to take advantage of the 440 square feet of unused space on one trailer and use that energy to power the components. As transport trucks turn from diesel to electric power, it’s hoped the solar trailer technology can also extend the range of the vehicles.

McMaster is one of three Ontario universities leading the advanced manufacturing consortium, which provides businesses with access to our technical expertise and world-class assets.

Hot topic

We lose as much as 70 per cent of the energy we produce in energy transmission through the electricity, natural gas and pipe oil pathways that supply our communities. Research by Jim Cotton in the Department of Mechanical Engineering is finding ways to take back that energy through harvesting heat, with sides of improved energy efficiency and reducing greenhouse gas emissions. Initiatives in integrated energy systems research includes experimental and computational investigations of heat transfer, thermodynamics and fluid dynamics.
Open to criticism

McMaster employees are actively encouraged to raise concerns about their working environment, both formally and informally, though the university works with employee groups to identify and resolve issues before they become a problem. Employees may turn to the Ombuds Office for confidential help. The Equity and Inclusion Office has a broad mandate, but in more narrow terms, it’s there to find and address inequity and exclusion.

Stopping exploitation and abuse

McMaster is committed to the International Labour Organization (ILO), which promotes an end to oppression, exploitation and abuse of workers worldwide. Suppliers, subcontractors and licensees of the university are expected to comply with these standards, including an obligation to respect, promote and realize the principles of fundamental labour rights, freedom of association and the right to collective bargaining, the elimination of all forms of forced or compulsory labour, the effective abolition of child labour, and the elimination of discrimination against women.

Balancing the scales

Pay equity and the concept of equal pay for equal work matter to McMaster. Collective bargaining ensures frequent pay equity checks for unionized staff, while faculty pay is analyzed annually to pinpoint—and eliminate—any systemic gender imbalance. For example, in 2015, female faculty across the board were given a $3,515 raise to match their salaries with those of their male colleagues.

A living wage

McMaster took part in Hamilton’s Living Wage group, a coalition of labour, academic and social services convened to determine the community’s living wage for a family of four, with two adults working full-time. Payroll data for 2016-2018 shows that all of the university’s full-time, permanent unionized employees, Faculty Association members and the management group are paid above that hourly rate, which is higher than the province’s 2020 minimum wage of $14.25.

On-the-job learning

Approximately 2,700 students hold positions at the university as teaching assistants. TAs lead class discussions, mark assignments, meet and correspond with students, and facilitate help sessions. Being a TA is a great way to gain valuable experience at the head of the class while supplementing the bank account. Graduate student TAs earn $44.51 per hour, while undergraduate TAs earn $25.81. McMaster also works to ensure that part- and full-time internships, when available, are paid.

Spotlight on Labour Studies

The School of Labour Studies offers certificates, undergraduate and graduate programs for students seeking careers in law, community development, policy analysis, teaching, research and more. Members of the faculty seek answers to such questions as: How do national dreams propel migrant workers into global circuits of labour? What are the causes and ramifications of work injuries and illnesses among racialized precarious workers? And how do gender identity and sexual orientation affect worker experiences in non-metropolitan cities?

Work in a Global Society

How is the world of work changing in a globalized world? What counts as work and who is a worker? What impact does extreme employment precarity have on the health and well-being of workers? Affiliated with the university’s School of Labour Studies, the Institute for Work in a Global Society (WIGS) research group brings a social science perspective to issues of concern to paid and unpaid workers.

Judith Fudge, Professor, School of Labour Studies, is a world-renowned scholar of labour law in Canada and internationally.

Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.
Safe nuclear power in the face of disaster

Global disasters have demonstrated the need to create innovative, holistic and interdisciplinary solutions to mitigate seismic risk to the global nuclear infrastructure so many countries depend on. Enter the Natural Sciences and Engineering Research Council CaNRisk Collaborative Research and Training Experience program, or CaNRisk-CREATE. The team’s mission is to train the next generation of experts to ensure nuclear infrastructure systems are resilient under cascading hazards.

Dipping into a big pool of talent

The McMaster Computing Infrastructure Research Centre (CIRC) offers Innovation-as-a-Service (IaaS), a fee-for-service R&D centre that helps companies turn ideas into real products using a cost-effective and fast-paced approach. The service is provided by a team of engineering researchers and students, working across a variety of technologies and application areas. Projects have included an algorithm-based system for improving runway safety, and a new thermal management system for cooling micro-data centres.

Sustainable energy conversion process

The McMaster Advanced Control Consortium brings together academics and industry to develop chemical processes that are environmentally friendly, socially acceptable and economical. Under the theme of Sustainable Design, MACC researchers are developing more sustainable processes to convert biomass, coal, natural gas, shale oil and nuclear energy into electricity, gasoline, diesel, methanol, dimethyl ether and hydrogen. While not yet in a position to satisfy power demands on a municipal scale, process innovations can reduce carbon dioxide emissions, improve thermal and carbon efficiencies, reduce fossil fuel consumption and increase profitability.

Form and function

The McMaster Nuclear Reactor is the world’s only self-funded research reactor, providing neutrons for research and producing vital medical isotopes. Access to neutrons is essential to support Canadian innovation in medicine, environmental and agricultural sciences, advanced materials and clean energy technology. The university has teamed up with Bruce Power, the world’s largest operational nuclear facility — which provides electricity to Ontarians and medical isotopes globally — to develop and promote nuclear technologies in the province.

Build resilient infrastructure, promote sustainable industrialisation and foster innovation.

Follow the shipping CLUEs

The free shipping offered by many online retailers comes with a hidden price few shoppers are aware of when they click the Buy Now button — emissions from more delivery trucks, wear-and-tear on roads, traffic congestion and heavy vehicles through residential areas. Elkafi Hassini, a supply chain management expert with the DeGroote School of Business and head of the Smart Freight Centre at McMaster, is working to find ways to make commerce more efficient while taking a toll on communities. The Smart Freight Centre’s $11-million, four-year initiative CLUE: City Logistics for the Urban Economy will see researchers at McMaster and its partners execute 24 projects to bridge the knowledge gaps in Canada’s urban freight system.

Warm thoughts in action

The ICE-Harvest project — Integrated Community Energy and Harvesting Systems — pulls excess heat created by electricity generation and heat production at the community level, then redistributes it where and when it’s needed through a combination of heat pumps and absorption chillers. The research born of the project installed at the Gerald Hatch Centre will help communities to site, design, optimize and control ICE-Harvest systems to economically achieve greenhouse gas reduction targets and better manage the energy grid.

Sprinkling green on grey

In June 2019, McMaster became the first Canadian university to offer digital degrees, anchored by Bitcoin blockchain technology. These portable, secure transactions allow employers anywhere to verify academic credentials.

IN JUNE 2019, McMASTER BECAME THE FIRST CANADIAN UNIVERSITY TO OFFER DIGITAL DEGREES, ANCHORED BY BITCOIN BLOCKCHAIN TECHNOLOGY. THESE PORTABLE, SECURE TRANSACTIONS ALLOW EMPLOYERS ANYWHERE TO VERIFY ACADEMIC CREDENTIALS.

Bringing ideas to market

Located just east of the main campus, the McMaster Innovation Park supports startups and scale-ups with a focus on life sciences and biotechnology; engineering and advanced manufacturing; and information and communication technology. A bridge between academia and industry, MIP is home to 70 companies, with more than 800 people working on-site. MIP helps students and industry transform ideas from vision to commercial reality, bolstered by the technical prowess of McMaster and other academic institutions.

IN JANUARY 2019, McMASTER BECAME THE FIRST CANADIAN UNIVERSITY TO OFFER DIGITAL DEGREES, ANCHORED BY BITCOIN BLOCKCHAIN TECHNOLOGY. THESE PORTABLE, SECURE TRANSACTIONS ALLOW EMPLOYERS ANYWHERE TO VERIFY ACADEMIC CREDENTIALS.

Leed-ing by example

The Gerald Hatch Centre — a living laboratory for researching and applying sustainable building technologies as well as being a student centre for experiential learning — was built to meet a zero-net energy threshold and demonstrate its potential as a standalone resilient facility. The Ron Joyce Centre, the Burlington site of the DeGroote School of Business, is a LEED Gold certified building, demonstrating sustainable site development, water efficiency, energy efficiency, materials selection and indoor environmental air quality.

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Within and among countries.

Opportunity and education

The Michael G. DeGroote School of Medicine has enhanced the equity streams for its admissions process to include applicants from socio-economically vulnerable backgrounds, Black applicants and Hispanic/Latino applicants, in addition to the equity stream for Indigenous applicants, and is developing and expanding mentorship opportunities. Four minors in the Faculty of Social Sciences target areas of potential inequality: Diversity and Equity; Gender; Sexualities and Families; Immigration, Race Relations and Indigenous-Settler Relations; and Asian Studies. As well, Faculty of Humanities offers an interdisciplinary minor in African and African Diaspora Studies.

A strategic plan to meet complex challenges

McMaster turns the spotlight on inequality at home and abroad in a number of ways. Public lectures inform on topics such as wage inequality in low-skilled jobs, and how that has been linked to political events and worldwide protest movements. The Wilson Institute’s Visiting Speakers Series pulls back the curtain on issues such as Black life in Canada, racism and the colour of democracy.

The right to good health

The McMaster Institute for Health Equity promotes healthier, fairer lives for all by understanding and highlighting the underlying causes of such inequality. At the global level, stark inequities are found in health outcomes between countries, but dramatic differences in health status and outcomes are also found within nations — even affluent countries like Canada. The institute draws on McMaster’s strengths in interdisciplinary research, knowledge mobilization and community engagement and as one of the top universities in the world for health and medicine.

A strategic plan to meet complex challenges

McMaster is well positioned to play a considerable role in addressing the profound challenges that face us in the 21st century.

Developing networks

McMaster is the host institution for Academics without Borders (AWB), a virtual, volunteer-driven NGO that connects academics in the developed world with colleagues and universities in developing countries. With the ongoing engagement of its faculty and staff with AWB, McMaster seeks to support higher education to foster greater prosperity, equity and well-being for all. Recent projects include bolstering rural medicine in Nepal and developing a centre that assists students with disabilities at the State Islamic University in Yogyakarta, Indonesia.

Strategy sessions

McMaster’s Access Strategy helps undergraduate students from underrepresented groups succeed, from the application process through to graduation. Those groups range from first-generation university students and older learners to racialized minorities or those from low-income families and neighbourhoods. The university’s Equity, Diversity and Inclusion Strategy sets a course to champion the value of diversity and address persistent biases and inequities; and identify and implement best practices to achieve EDI goals by driving cultural, systemic and personal change. The confidential Employment Equity Census Report, which invites staff to help the university collect information to assist in decision-making, is in line with this strategy.

Cultural knowledge

The Indigenous Health Initiative of the Faculty of Health Sciences collaborates with partners on and off campus to better integrate Indigenous cultural knowledge into educational and research programs within the faculty, while prioritizing the recruitment of Indigenous faculty members and development of a robust cross-faculty Indigenous health curriculum. A number of its members helped form an Indigenous Health Practitioners task force in the fall of 2020, mobilizing to address inequities in care for Indigenous people.

1,119

Credit Transfer Students (an increase of 18 per cent compared to 2014-15) from 20 Ontario Universities and 20 Ontario Colleges of Applied Arts and Technology.
Make cities inclusive, safe, resilient and sustainable.

Beautiful, inside and out

McMaster University is woven deeply into the fabric of the community. The campus sits on 350 acres in Hamilton, Ont. — the City of Waterfalls — in a nature-rich setting of waterfalls, valleys, meadows, wetlands and forests. The 30-acre central core of campus is largely reserved for pedestrians and cyclists. The campus is part of a natural trail system managed by the Royal Botanical Gardens and the Conservation Authority. Public art, performances and cultural events are available to the public throughout the year, along with free access to historic buildings, archives, botanical and scientific collections.

Good neighbourhoods = good health

Jim Dunn spent more than a decade studying Regent Park, the largest urban redevelopment project in Canadian history. He found clear evidence that people who are more satisfied with their housing and neighbourhood, and who feel safer and more secure, also enjoy improvements to their overall health. Dunn is the Director of the McMaster Institute for Health Equity, and the Senator William McMaster Chair of Urban Health Equity. His latest work is as the director of the Canadian Housing Evidence Collaborative, an ambitious new pan-Canadian research network that brings together researchers, policymakers and individuals with lived experience from across Canada to tackle the complex issues involved in making safe, healthy housing affordable for all Canadians. The network was created to support the National Housing Strategy, a 10-year federal initiative that aims to cut homelessness in half and create housing for those with the greatest need — women and children fleeing abuse, Indigenous youth, people working through mental health conditions or addictions, and others who are marginalized or vulnerable.

Learning, reconciliation and remembrance

The Indigenous Circle — Karahakon Kateweenista (Learning in the Forest) in Mohawk, and Nibwaajkaawin Teg (Place of Wisdom) in Ojibway — was created under the guidance of McMaster’s Indigenous Education Council. Featuring tiered stone around a stage in the form of a medicine wheel, the space represents the interconnectedness of all beings. The area demonstrates the role nature and outdoor spaces play in teaching and learning and signifies the importance of Indigenous knowledge to the growth of the McMaster community. The circle also hosts performances, ceremonies and meetings.

Revitalizing underused land

McMaster is a key player in revitalizing city brownfield sites and underused land — putting them to good use and providing a boost to the local economy. For example, in the 10 years since the master plan for the McMaster Innovation Park was unveiled, the project has been transforming a 37-acre brownfield site, once home to Westinghouse Camco warehouse and plant facilities, into a place where scientists, researchers, engineers, and entrepreneurs turn ideas into commercial opportunities. Closer to campus, ambitious plans are underway to transform underused parking lots back into marshland, providing valuable habitats in a sensitive ecological area as well as opportunities for research.

Art and books and so much more

Coins, antiques, paintings, sculpture, maps — the McMaster Museum of Art houses more than 6,000 objects that illustrate the history of art from the late 15th Century to the 21st Century, including a carefully curated collection of Canadian art. The museum is a partner with the Department of Family Medicine in The Art of Seeing visual literacy program and offers lectures, workshops and guided tours for the public for all ages. McMaster’s four on-campus libraries — Mills Library, Inner Library, H.G. Thode Library and the Health Sciences Library — and their study zones and learning spaces, physical and digital, are also fully open to the public without charge. Aside from traditional services, historical archives from cultural figures and collections of rare books, the libraries offer space for podcasting, digital production and a makerspace with 3D printers, laser cutters and other tools for creating.

106 projects created at CityLAB Hamilton, where McMaster students and faculty work with the City of Hamilton, Mohawk College and Redeemer University to identify and solve complex challenges related to healthy neighbourhoods, climate change and municipal excellence

Getting from here to there — sustainably

With a campus that places a priority on pedestrians, it’s only natural that McMaster should encourage sustainable commuting for the entire campus community. Students receive subsidized bus passes for the school year, and transit links on campus connect McMaster to Hamilton, Toronto, Niagara and points beyond. The campus serves as a hub for a city-wide bike share program, which offers students a discounted membership. To reduce the number of cars coming to campus, the university has a carpool program that provides designated parking spots, as well as the opportunity to split the cost of a parking permit between multiple users.

Stars above

Graduate students, postdoctoral fellows and faculty from the Department of Physics and Astronomy guide shows at the W.J. McCallion Planetarium geared to children, families and all those who love to look up and wonder. The interactive presentations are tailored to the age and nature of the audience, touring the Milky Way, the constellations and interesting objects in and beyond our own galaxy. When possible, the show includes current celestial events in the skies over Hamilton.

Beautiful, inside and out

McMaster University is woven deeply into the fabric of the community. The campus sits on 350 acres in Hamilton, Ont. — the City of Waterfalls — in a nature-rich setting of waterfalls, valleys, meadows, wetlands and forests. The 30-acre central core of campus is largely reserved for pedestrians and cyclists. The campus is part of a natural trail system managed by the Royal Botanical Gardens and the Conversation Authority. Public art, performances and cultural events are available to the public throughout the year, along with free access to historic buildings, archives, botanical and scientific collections.

“People’s income and other socio-economic conditions are incredibly important to their health — and way more actionable than we’d like to believe.”

— Jim Dunn

McMaster Institute for Health Equity
Ethically sourced products for the university

McMaster was an early adopter of a policy to ensure that suppliers of goods to the university conduct their businesses ethically. The Code of Labour Practices demands they pay dignified living wages, treat women equally, and safeguard health and safety. As well, as one of the first Canadian universities to be a signatory to The Okanagan Charter, McMaster has used this collective, international benchmark to promote the health of people, places and our planet.

Sustaining interest

Sustainability efforts on campus are bolstered by the growing number of students enrolled in some of the innovative academic sustainability programs offered at the undergraduate and graduate level. McMaster’s Interdisciplinary Minor in Sustainability offers more than 70 courses from faculties across campus. The Sustainable Future Program provides students with interdisciplinary, student-led, community-based, and experiential education focused on sustainability. The student-led projects — which tackle everything from waste management practices to promoting a bike buddy program — are tagged in the program’s annual report with the SDGs they connect with the most.

Ensure sustainable consumption and production patterns.

Waste not, want not

McMaster’s Hazardous Waste Management Program covers all areas of the university to protect people and places. IT Collection offers free pickup of e-waste such as computers, cellphones and other items; if they can’t be wiped and refurbished for donation to those in need, they will be safely disposed of. A partnership allows the university to refurbish computer systems and give them to at-risk children in Hamilton. The university’s libraries also offer recycling bins for batteries, electronics and writing tools such as pens and highlighters. In 2018, McMaster diverted more than 8,500 pounds of electronic waste away from landfills through recycling, a three-fold increase year over year.

Don’t waste energy, harvest it

Jim Cotton is a mechanical engineer who’s using his research to develop thermal and electrical systems that allow harvesting and sharing of energy that would otherwise be wasted. Cotton’s Integrated Community Energy and Harvesting (ICE-Harvest) systems embed integrated thermal and electrical generation, as well as storage, within communities, so they can be powered, heated and cooled in a way that’s cost-effective and carbon-reduced. ICE-Harvest captures waste heat from various parts of the community, like sports arenas, grocery stores, and big box centres, and transfers this energy to other buildings.

TrashTalk makes some noise

The TrashTalk brand on social media and in-house signage actively raises awareness in the campus community about recycling and composting, educating students about what goes where — organic waste, recycling and “trash goes last.” All organic material is taken away daily by composting hauler, Planet Earth, to an environmental compost facility. The collected organic waste is used to produce high-quality soil blends, compost, and mulches for the agricultural and landscaping industries. The TrashTalk campaign doubled the number of organic waste bins needed from 2018 to 2019.

Eating green

The Choose To Reuse program encourages students, faculty and staff to use reusable mugs and green food containers — and get a discount on their beverage and food purchases — while dining on campus. The fee to join the program was $5, until Hospitality Services pushed to provide campus residents with a free Choose To Reuse membership card, resulting in a 294-per-cent jump in the use of the green eco-containers from 2018 to 2019.

Goodbye plastic, hello compostable cups

Dining facilities at the university use compostable cutlery, coffee cups, paper straws and take-out containers. Products are clearly labelled as compostable to encourage users to dispose of them in organic waste bins across campus. In 2019, Hospitality Services added 194,000 compostable coffee cups and eliminated 1.3 million pieces of plastic cutlery. Also, disposable napkins used at campus facilities are made from 100-per-cent post-consumer recycled paper and are fully compostable.

Local, local, local

Hospitality Services defines “local” as grown or produced in Ontario. As a large institution with over 3.6 million meals served annually, the Wellness and Sustainability team recognizes the purchasing power that Hospitality Services has to leverage to further support a sustainable food system. In 2019, the university purchased: 11,000 pieces of certified salmon; 700 kg of socially responsible coffee; and five per cent more local produce over 2018.

Waste not, want not

McMaster diverted more than 8,500 pounds of electronic waste.
When I graduated from high school I didn’t give it a second thought, I just wanted to work in environmental engineering.”

— Zoe Li

Climate Change Impacts and Environmental Systems Analysis

An observatory to observe the trees

The forests in eastern North America and around the Great Lakes form a natural carbon sink, meaning they absorb more carbon dioxide from the atmosphere than it releases. Geographer Altaf Amin uses advanced sensors to monitor the energy, carbon dioxide and water fluxes, temperature, soil moisture, tree height and diameter of trees at Turkey Point Observatory to determine which trees and forests are the most resilient in changing environmental conditions. His work here is part of a number of national and international networks that monitor crucial ecosystems, such as North American Carbon Program, Global Fluxnet and Global Water Futures. The data also informs Arain’s climate and hydrologic modelling research, which uses advanced technology to discern patterns that help predict climate change.

Public perceptions and policy

The McMaster Centre for Climate Change connects science, technology and policy to deliver a broad range of local and global climate change solutions. Aside from understanding the impact of climate change, the centre’s goals include exploring perceptions of and responses to climate change, encouraging the application of science in meeting it head-on, and developing public policies to meet societal challenges caused by future climate change.

Measuring water and climate risk

Managing water flow is an uncertain business, especially in a world with a changing climate — it can mean the difference between a flood and a drought. A team of McMaster civil engineers led by Zoe Li has developed an Ontario-wide project that gathers climate and weather data and uses a machine learning process to produce climate projections for a specific area. Farmers can use the predictions to decide what crops to plant. Water infrastructure can be built to meet predicted flows over 50 or 100 years. It has even been sufficiently downscaled to offer useful data for calculating the estimated energy consumption of a building.

A weather eye on sea ice

In Canada’s arctic, the safety of Inuit and northerners depends on sea ice, and the movements of fish and caribou are part of daily life. In this environment, the effects of climate change are glaringly evident. But policymakers don’t always have the information, the resources or the will to consider the community’s experiences of climate change. Geographer Gita Lybéric and her cross-disciplinary team at StraightUpNorth are closely involved with local communities, co-creating solutions that pair social and environmental research, and Inuit and scientific knowledge in decision-making.

Greener roads

Climate change and environmental emissions are intertwined with economic prosperity and must be considered for the sustainability of the transportation industry and the planet. The McMaster Institute for Transportation and Logistics is a non-profit organization of private and public-sector investors that works with business and government partners to address challenges and brings together the resources, expertise and experience the industry desperately needs. The MITL’s key focus areas are research, education and outreach.

Leading by example

The Office of Sustainability provides tools and information regarding best practices to promote energy conservation and assists in implementing energy conservation programs to engage staff, faculty and students in practising energy efficiency. The university’s sustainable building policy states that every new building on campus will have a minimum of Leadership in Energy and Environmental Design (LEED) Silver Certification. The return on the LEED investment includes financial and energy savings and increased efficiency in utilities and other operating costs over the building’s lifespan.

Money talks

McMaster has pledged with several other leading Canadian universities to work together on climate change initiatives across invested assets, as part of Investing to Address Climate Change: A Charter for Canadian Universities. It agrees to incorporate environmental, social and governance factors into investment practices, and to regularly assess the carbon intensity of portfolios and set targets to reduce them. The university has also signed the United Nations Principles for Responsible Investments, committing to transparent measurement, carbon-reduction goals and reporting. As part of responsible investing practices, McMaster has pledged a 45-per-cent carbon reduction of the public equities within the investment pool by 2030.

Mac’s carbon-neutral plan

The Environmental Sustainability Plan is a road map for the University to contribute to the Ontario Climate Change Action Plan’s greenhouse gas emissions reduction targets of 57 per cent below the 1990 level by 2030, and 80 per cent by 2050. It outlines completed, ongoing and future projects to reach these targets, such as retrofitting existing systems to be more energy efficient, switching to electric or biogas boilers and using solar power.
Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

What fish can tell us

The Aquatic Behavioural Ecology Lab investigates the evolution of complex breeding systems, social behaviour, reproductive tactics and decision-making in animal societies, primarily using fish as subjects. Like humans, fish are vertebrates, and make good comparative model species to try to uncover the evolution of behaviour. As well, there is a great deal of economic interest in fish as a food resource, as a recreational sport and in the aquarium hobby. ABEL’s three main field locations are Lake Tanganyika — the second deepest lake in the world — in the East African Rift valley; Hamilton Harbour and Lake Ontario; and beaches in the Pacific Northwest.

Listening to Arctic voices

McMaster and Ottawa’s Carleton University are home to the OceanCanada Arctic Ocean Working Group, which covers Canada, Denmark, Norway, Sweden and the United States. The group’s key goal is the empowerment of community voices in the Arctic region, developing policy-relevant recommendations for protection, conservation and management of coastal and ocean resources. The United Nations University Institute for Water, Environment and Health — based out of McMaster — is also a member of OceanCanada.

Sustainably sourced fish on the menu

In 2019, Hospitality Services decided to no longer support the purchase of fish that was not sustainably sourced. An ordering guide was created for acceptable fish products, which include ASC, MAC and Ocean Wise certified products. According to the 2019 Wellness and Sustainability Overview, the university purchased 11,000 pieces of sustainably sourced salmon.

Impact of wastewater on aquatic life

Researchers in the Faculty of Science use the Cootes Paradise Marsh — a 1,482-acre marshland at the western edge of Hamilton Harbour — as a living laboratory to explore the impact of effluents and treated wastewater on aquatic life in the marsh. The team hosts information sessions in partnership with the Royal Botanical Gardens to increase public knowledge of water quality and raise awareness of research findings.

Back to the future of fisheries

The Fisheries Archaeology Research Centre investigates long-term trends in fisheries production resulting from environmental change and human exploitation. The work helps address current concerns with global climate and environmental change and the effects of over-fishing in different parts of the world. One major ongoing research program monitors 10,000 years of fish and shellfish use on the coast of British Columbia. A second major area of ongoing research concerns the effect of human colonization in Polynesia on the production and productivity of reef fisheries.

Saving wetlands through citizen science

iWetland, out of the McMaster Ecotechnology Lab, draws information from automated and crowdsourced monitoring stations in the Georgian Bay Biosphere Reserve, the world’s largest freshwater archipelago. Working with provincial parks and First Nations communities, the team hosts events to raise awareness of wetland ecosystems, species at risk and the iWetland citizen science initiative. It also installed a weather station in the Magnetawan First Nation, training MFN staff to operate the equipment.

Something to talk about

Ohneganos: Let’s Talk Water is a student-led YouTube show hosted by McMaster Indigenous Studies student Makasa Looking Horse that shares stories, art and film. Episodes feature interviews with knowledge keepers, scholars, artists, musicians and activists interested in issues related to climate change, water and Indigeneous well-being. A Facebook Live component encourages viewer participation. The show also seeks to engage advocates under 25 with smaller social media initiatives. Ohneganos is a McMaster University and Six Nations project supported by Global Water Futures.
Dry peatlands add to fire risk

International research led by McMaster scientists Mike Waddington and Manuel Helbig has pinpointed dramatic differences in the ways boreal forests and peatlands regulate water loss. The problem is, most global climate models assume all biome is trees, not the spongy bogs and fens of peatlands, which are prone to drying out as the climate warms. Drier peatlands mean bigger, more intense fires that can release vast amounts of carbon into the atmosphere, accelerating global warming.

Conservation strategies

Geographers at the School of Earth, Environment and Society is investigating how forest ecosystems in southeastern Canada function and respond to climate change and extreme weather conditions. Extensive land use changes, agricultural activities and forest harvesting in the Great Lakes region are putting pressure on water resources, as are more frequent extreme weather events and climate change. Funded by a Global Water Futures grant that supports a multidisciplinary team of researchers from multiple universities and other collaborators, the project is intended to help guide municipalities and conservation authorities in developing watershed management strategies to account for shifts in land use and climate change.

Nature in our backyard

McMaster’s historic campus sits on 350 acres in Hamilton and offers nearby waterfalls, valleys, meadows, wetlands and forests to explore in Cootes Paradise, McMaster Forest, Webster’s Falls and the Niagra Escarpment, a UNESCO biosphere reserve since 1990. Nature at McMaster assists with the land management of natural areas related to trails and invasive and native species management on the university’s property, runs hiking events, stewardship projects and offers classroom and outdoor learning programming.

No-parking zone at Coldwater Creek

One of the most dramatic projects on the campus is the transformation of a major parking lot area into a space that serves the university’s needs from an environmentally sustainable perspective. Up came the pavement, down — and in the ground — went 140 native trees and shrubs in a 30-metre buffer area to protect Coldwater Creek. Student volunteers and professors built a series of sand piles along the buffer to serve as nesting habitat for turtles. The next stage is Designing Paradise, a collaboration involving faculty, students and partners throughout the McMaster community and beyond to “re-naturalize” the area.

Digging around

According to the Campus Sustainability Assessment Framework, there are about 5,000 trees on the main campus, not including the woodland property that surrounds the campus. The university commits to planting new trees every year, often in planting days that bring together community members and students. McMaster typically plants more than 200 trees a year through facilities and student initiatives.

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.

McMaster Forest is an incredibly biodiverse area of mixed forests, old growth forests, wetlands, meadows, creeks and prairie. Like McMaster’s forest station at Turkey Point, it is an ideal research and teaching location.

Forest for the trees, and everything else

The 115-acre McMaster Forest has been designated by the McMaster Senate and the Board of Governors as environmentally significant natural land to be used for ecologically sensitive teaching, research and recreation purposes. It is an incredibly biodiverse area of mixed forests, old-growth forests, wetlands, meadows, creeks and prairie. Many undergraduate courses use the property, and it’s the site of undergraduate and graduate research projects. The public is welcome to visit the forest.

Out of the classroom, into the community

Students in SUSTAIN 200 – part of McMaster’s interdisciplinary Sustainable Future Program – take part in community-based, experiential research that places local knowledge and action within a global context. Projects in 2019-2020 have included work with Hamilton’s Community Permaculture Lab, a survey of hand-made bee habitats on campus and planting more than 100 trees on campus, while also removing more than 100 invasive species. It’s anticipated that more than 1,000 students will complete a SUSTAIN course in the 2020-2021 academic year.

Hamilton – City of Waterfalls
Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

Leading Globally Engaged Universities program

As part of the university’s commitment to global engagement, McMaster is an active member of the International Association of Universities. In May 2018, McMaster hosted the fifth session of the IAU’s Leading Globally Engaged Universities program, a leadership training program. It was the first time this program was held in North America. Attendees came from Colombia, Haiti, Ghana, Romania, South Africa, Thailand, the U.K., the U.S., as well as from across Canada. The program recognizes the important role higher education institutions can play in the development of sustainable and democratic societies.

Peace and reconciliation

Olive Wahoun, Associate Professor in the School of Nursing at McMaster University, is co-lead for the Teaching and Learning working group of the Commonwealth Peace and Reconciliation Network. The network brings together an interdisciplinary collective of academics, researchers and professional staff from more than 40 universities across the Commonwealth who work in the fields of peace, truth, justice, and reconciliation. Knowledge, capacity and resources can be shared through the network to engage in activities that have a direct impact on university practice and the wider world.

Eyes and ears for the UN

In his role as chair of the UN Expert Mechanism on the Right to Development, Bonny Ibhawoh — who holds the university’s Chair in Global Human Rights — works to monitor, evaluate and report on conditions around the world related to the rights of individuals and countries to freely enjoy economic, social, cultural and political progress.

I see this appointment as an opportunity for international service, and to contribute to the promotion and protection of human rights globally.”
— Bonny Ibhawoh
Centre for Peace Studies

Curriculum for Peace

The interdisciplinary Peace Studies program is concerned with war and peace, violence and non-violence, conflict and conflict transformation. By focusing attention on problems of conflict, particularly of a violent nature, researchers attempt to improve our methods of analyzing and dealing with these problems. The university also hosts the Hope Chair in Peace and Health. As well as teaching and conducting research, the chair works collaboratively to establish on-campus and community events and programs.

Playing a national advisory role in Canada’s response to COVID-19

McMaster researchers are taking leadership roles in Canada’s response to the COVID-19 pandemic – from serving on national task forces to conducting research that will influence public policy.

Innovation in government

Participa: A Global Partnership to Create and Mobilize Knowledge About Democratic Innovations examines public participation in governance and what forms work best for specific problems and issues, under specific circumstances. The research team, which includes McMaster Chair of Global Human Rights Bonny Ibhawoh as a co-investigator, aims to map this rapidly developing domain of political innovation to create the information base necessary for high-quality research and evidence-based public policy practice.

Celebrating Gandhi

The Gandhi Peace Festival is held annually on the weekend closest to the day of his birth, Oct. 2. The festival is intended to promote non-violence, peace and justice, to support local peace and human rights organizations, and to draw attention to and encourage dialogue about issues around the world. It is co-sponsored by the India-Canada Society of Hamilton and the Centre for Peace Studies, and is twinned with the annual Mahatma Gandhi Lectures on Non-violence. In 2020, the theme of the festival was Black Lives Matter, while the 20th annual lecture explored the topic From the Civil Rights Movement to Black Lives Matter.

A better neighbourhood, a better city

McMaster University has a main campus in west Hamilton bordered by three residential neighbourhoods and multiple sites in the heart of downtown Hamilton, in Burlington and other communities. Therefore, strong working relationships between McMaster and its surrounding communities are paramount to supporting the vitality and well-being of the university and greater Hamilton area. The President’s Advisory Committee on Community Relations provides an open forum for respectful dialogue and ongoing collaboration between the university and our neighbours. As part of the Hamilton Anchor Institution Leadership, McMaster collaborates with the city’s other large public- and private-sector members to address Hamilton’s complex challenges.
Strengthen the means of implementation and revitalise the global partnership for sustainable development.

Be part of the change

MacChangers pairs multidisciplinary teams with community members to propose innovative solutions to challenges facing Hamilton, as well as the global community. The non-credit program welcomes students from all faculties to share their expertise and there is no cost to enroll. In alignment with the city’s 25-year community vision, past projects include developing a resource hub for housing needs; closing gaps in the cycling path between the university and the downtown core; and reducing exposure to open-air secondhand smoke by promoting a smoke-free section along King William, a popular restaurant row.

Evidence, Insight. Action.

The McMaster Health Forum marked its 10th anniversary in 2019, and is designated as the WHO Collaborating Centre for Evidence-Informed Policy. The Forum’s goal is to generate action on the pressing health-system issues of our time. It strengthens health systems — locally, nationally and internationally — and gets the right programs, services and drugs to the people who need them.

Partners in global health

The university has more than 1,900 partnerships with faculty, institutions and communities in 247 countries and regions. The Global Health Office works with many of these partners to find new and innovative solutions to critical global health problems. As a result of its efforts, McMaster has advanced the education of women health professionals in Pakistan, improved the health of vulnerable people in Indonesia, and, most recently, worked to improve access to higher education in underserved communities in the Far North of Canada and Norway. The university’s School of Nursing is designated a PAHO/WHO Collaborating Centre, which focuses on global priorities in primary health care.

McMaster has student exchange agreements with more than 170 post-secondary institutions worldwide.

McMaster, the United Nations and Global Water Futures

McMaster is the only university in Canada to serve as host and partner to a United Nations University through the Institute for Water, Environment and Health (IUNU-IWEH) which acts as the UN think tank on water. Researchers at McMaster play a key role in Global Water Futures, a collaboration driven by four major institutions to transform the way communities, governments and industries in Canada and other cold regions of the world prepare for and manage increasing water-related threats. GWF is the largest university-led freshwater research program ever funded worldwide, in part with a $77.8-million grant from the Canada First Research Excellence Fund. In 2020, GWF extended funding for two McMaster projects and awarded three new projects funding from a total $2.4 million.

Harnessing expertise

As a member of Universitas 21 (U21), McMaster University participates in a leading global network of research-intensive universities that has helped more than one million students and 200,000 staff. U21 facilitates the delivery of programs, activities and initiatives that could not be reached through a single university or via bilateral agreements. RISE (Real Impact on Society and Environment) is U21’s international showcase of student achievement in sustainability and social innovation. In 2019, a McMaster student took one of the four RISE prizes with Guided Hands, a product that helps those with limited fine motor skills complete everyday tasks, such as writing, painting and fully participating in school and society.

Global Nexus for Pandemics and Biological Threats

McMaster launched the Global Nexus for Pandemics and Biological Threats to ensure Canada and the world are better able to manage the human and economic devastation of COVID-19 and avert future pandemics. Led by McMaster researchers from many disciplines, the Global Nexus is developing an international network of scientists, clinical health and medical specialists, engineers, social scientists, history and policy researchers, economics and business experts devoted to one goal: preventing future pandemics and mitigating global health threats like antimicrobial resistance. The innovative network has already garnered international attention, and government and philanthropic support for its approach in its first few months.

Making connections

The McMaster Global annual showcase turns the spotlight on the university’s mission to make global engagement in education and sparking ideas an integral part of its presence in Canada and the world. A host of free activities, lectures and workshops are open to all. McMaster Global is engaged in international partnerships that involve research collaboration, faculty exchanges, student exchanges and mobility agreements and joint supervision of doctoral students.

Strengthen the means of implementation and revitalise the global partnership for sustainable development.

Be part of the change

MacChangers pairs multidisciplinary teams with community members to propose innovative solutions to challenges facing Hamilton, as well as the global community. The non-credit program welcomes students from all faculties to share their expertise and there is no cost to enroll. In alignment with the city’s 25-year community vision, past projects include developing a resource hub for housing needs; closing gaps in the cycling path between the university and the downtown core; and reducing exposure to open-air secondhand smoke by promoting a smoke-free section along King William, a popular restaurant row.
University Impact Rankings for the SDGs

Established in 2015, the United Nations Sustainable Development Goals set out a vision for countries and institutions worldwide to come together in a concerted effort to end poverty, reduce inequalities, improve health and education, and advance sustainability and economic growth while addressing climate change.

In 2019, Times Higher Education introduced its Impact Rankings, which measure universities’ contributions in support of the UN SDGs. In 2020, McMaster University ranked 17th globally and 3rd among Canadian universities, demonstrating McMaster’s commitment to advance human and societal well-being locally and globally.

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McMASTER IS A UNIVERSITY WITH IMPACT

We are ranked among the top 70 universities globally and, through our cutting-edge research and world-class teaching and learning, we are focused on advancing human and societal health and well-being — in our community and around the world.

As the pioneers of problem-based learning, we have a rich history of educational innovation. As Canada’s most research-intensive university, we work across disciplines to find creative solutions to complex problems, helping to improve people’s lives and build a brighter future for all.

BRIGHTER WORLD