MESSAGE FROM THE VICE PRESIDENT, RESEARCH & INNOVATION

Research is what defines us as a comprehensive university, and Ryerson is on an incredible trajectory that we can all be proud of. Ryerson continues to draw upon our strengths across disciplines to create meaningful economic and societal impact across key priority themes: Digital Media; Energy, Sustainability and the Environment; Health and Well-Being; Civil Society, Design; Creative Expression and Cultural Industries, and Innovation. Our researchers are gaining recognition on a global scale. The expertise of our researchers, centres, and institutes continues to be sought after by government agencies, industry, and community organizations who are keen to partner with us, and their investments have resulted in an outstanding year in research funding. We are also being recognized and emulated for our commitment to innovative learning models that provide unmatched opportunities for our students, both undergraduates and graduates, to gain real world experience that takes their educational training to the next level.

While this report does not list individual awards, as we have done in past years, we recognize the tremendous contributions of each of our faculty and students and congratulate them on their hard work, and we acknowledge the support of our many collaborators and funders.

Wendy Cukier, Vice-President, Research and Innovation
In 2012-13 Ryerson broke the $30 million mark in research revenue for the first time.

Ryerson received its research mandate 20 years ago and has rapidly expanded its Scholarly, Research and Creative (SRC) activities since then.

In 2012-13, Ryerson has not only continued its success in research funding from the Tri-Council agencies — the Natural Sciences and Engineering Research Council of Canada (NSERC), the Social Sciences and Humanities Research Council (SSHRC), and the Canadian Institute for Health Research (CIHR) — we have also built upon our long history of collaboration with industry and community partners to achieve an outstanding year in research funding.

We are pleased to report that in 2012-13, Ryerson broke the $30 million mark in research revenue for the first time. The University moved up two positions in the latest rankings from Re$earch Infosource from 29 to 27 among all Canadian universities, and 11th among universities without medical schools.1

In addition to an increase in research funding, our reputation as a comprehensive university continues to move upwards, with the allocation of new Canada Research Chairs and the recognition of our faculties’ accomplishments. The following section highlights our funding achievements.

While Ryerson assesses research intensity based on funding, number of publications and citations, and commercialization, we recognize that these traditional performance indicators do not reflect the full breadth of our Scholarly, Research and Creative activities.

1 Re$earch Infosource uses metrics from 2011/2012 for its 2013 report.
Ryerson’s total research funding is on an upward trend, tripling in less than 10 years and growing by over $10 million in the past five years, from $21.8 million in 2008-09 to $32.3 million in 2012-13.

While the Tri-Council agencies – NSERC, SSHRC, CIHR – remain the largest individual sources of funding for Ryerson, the University has also diversified its funding through contributions from other federal sources, provincial and municipal governments, international community organizations, and industries.

With the investments of over 180 funding partners, Ryerson’s impressive growth represents a 13.1% increase from 2011-12, which points to our leadership in innovation and the recognition of our excellence in scholarly, research and creative activity.
With continued success in Tri-Council funding, Ryerson has increased its number of Canada Research Chairs (CRC). CRC designations are allocated based on the University’s share of total Tri-council funding over the three most recent years. In 2012-13, Ryerson was granted one Tier 1 and two Tier 2 CRCs, bringing our total allocation to 16.

Canada Research Chairs are some of the world’s most accomplished and promising researchers, making major contributions to the advancement of knowledge in engineering and the natural sciences, health sciences, humanities, and social sciences. Through their research excellence, our CRCs are not only helping to train the next generation of highly skilled people. They are also positively impacting the well-being of Canadians and our economy.

In total, Ryerson received $1.75 million in funding in 2012-13 for our CRC program, accounting for 5.4% of total research funding this year.

Four of Ryerson’s CRCs were also renewed for another five years, including:

- Sridhar Krishnan (Biomedical Signal Analysis);
- Catherine Middleton (Communication Technologies in the Information Society);
- Marcello Papini (Abrasive Jet Technology);
- Victor Yang (Bioengineering and Biophotonics).

Other active CRCs at Ryerson are Irene Gammel (Modern Literature and Culture), Ling Guan (Multimedia and Computer Technologies), Michael Kolios (Biomedical Applications of Ultrasound), Krishna Kumar (Space Systems Engineering), Guangjun Liu (Control Systems and Robotics), Souraya Sidani (Design and Evaluation of Health Interventions), and Gideon Wolfaardt (Environmental Interfaces and Biofilms).

Dr. Chow is developing a model for public transit systems that takes into account the activity patterns of travelers. His research will lead to better design and management of public transit logistics systems.

For several years, the Tri-Council agencies have faced flat budgets while receiving an increasing number of applications. This has led to intense competition and a decline in success rates across many universities. Despite these challenges, Ryerson continues to outperform other universities and continues to increase its share of Tri-Council funding within all three agencies.

Increasing in the Tri-Council market share is important because it determines Ryerson’s access to certain programs. For instance, the Canada Foundation for Innovation’s infrastructure funding and the number of Canada Research Chair allocations are directly proportional to the amount of total Tri-Council funding received by the university.

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RESEARCH GROWTH THROUGH PARTNERSHIPS & OTHER INVESTMENTS

OTHER FEDERAL SOURCES

Ryerson received $5.31M over 101 grants in total matched and direct funding from other federal agencies, including Canada Foundation for Innovation (CFI), Networks of Centres of Excellence (NCE), and the Canadian International Development Agency (CIDA), among others. Ryerson had a highly successful year in partnership with the Federal Economic Development Agency for Southern Ontario (FedDev), with a sixfold increase in funding. In total, Ryerson received $3.04M in FedDev funding, which accounted for 9.4% of all research funding received.

PROVINCIAL, MUNICIPAL & INTERNATIONAL SOURCES

Ryerson received $2.68M in Ontario Government funding over 45 grants, from ministries such as the Ministry of Health and Long Term Care and the Ministry of Community and Social Services, among others. Provincial Funding accounted for 8.3% of total SRC funding, increasing 16.6% from the previous year. The University also doubled its municipal investments, receiving $260,000 through research projects sponsored by the City of Toronto and others. Beyond Canadian investments, international funding at Ryerson nearly tripled from the previous year, making up 3.5% of total SRC funding received. Ryerson received $1.14M in international funding from sources including the World Bank, Network of European Foundations, the National Institutes of Health (US), and others.

EXTERNAL AWARDS

Ryerson takes pride in the scholarly, research and creative contributions of our faculty and the impact they are having in their respective fields. Here is a small sample of awards recognizing just a few of our faculty.

Martin M. Antony (Psychology) received the Award for Distinguished Contributions to Education and Training in Psychology from the Canadian Psychological Association and was elected to Fellow status in the Association for Psychological Science.

Robert Botelho (Chemistry and Biology) was awarded the Maud Menten New Principal Investigator Prize from CIHR, which recognizes and supports the research excellence of Canadian New Investigators advancing human and model genomes research related to health and disease.

Seth Dworkin (Mechanical and Industrial Engineering) was awarded the I. W. Smith Award for outstanding achievement in creative mechanical engineering within 10 years of undergraduate graduation from the Canadian Society for Mechanical Engineering (CSME).

Sedapli Guruge (Nursing) received the Sigma Theta Tau International Lambda Pi-At-Large Chapter’s 2012 Dorothy M. Pringle Award for Excellence in Nursing Research for her integral role in developing the Nursing Centre for Research and Education on Violence Against Women and Children at Ryerson.

Candice M. Monson (Psychology) was named the Traumatic Stress Psychologist of the Year by the Canadian Psychological Association, Traumatic Stress Section.

Ravi Ravindran (Mechanical and Industrial Engineering) was awarded the Engineering Medal - Research and Development for using new knowledge to advance engineering and applied science from the Ontario Professional Engineers Awards (OPEA).

Barbara Vogel (Interior Design) and Morton Beiser (Psychology) received the Queen Elizabeth II Diamond Jubilee Medal awarded by the Senate of Canada to honour significant contributions and achievements by Canadians in every field.

INTERNAL AWARDS

Each year Ryerson acknowledges its researchers through the Deans’ Scholarly, Research and Creative (SRC) Activity Awards, and the Sarwan Sahota Ryerson Distinguished Scholar Award.

The Deans’ SRC Awards recognize individual faculty members for outstanding achievement in SRC activity, having made an impact within their disciplines during the previous academic year. Here are the recipients for 2012-13:

Faculty of Arts: Claus Rinner (Geography), and Emily Van der Meulen (Criminal Justice and Criminology).

Faculty of Community Services: Suzanne Fredericks (Nursing) and Josephine Wong (Nursing).

Faculty of Communication and Design: Marusya Bociurkiw (RTA School of Media), Gerda Cammaer (School of Image Arts), and Osmud Rahman (School of Fashion).

Ted Rogers School of Management: Shadi Farshadfar (Business Management), and David Valliere (Business Management).

Faculty of Engineering and Architectural Science: Farrokh Janabi-Sharifi (Mechanical and Industrial Engineering), Mehrav Mehrvar (Chemical Engineering), and Seth Dworkin (Mechanical and Industrial Engineering).

Faculty of Science: Pawel Prlat (Mathematics).

The Sarwan Sahota Distinguished Scholar Award is presented annually to a faculty member who has made an outstanding contribution to knowledge or artistic creativity in their area of expertise. The award is made possible through the joint contributions of Sarwan Sahota, a retired professor, and the university.

In 2012-13 the award was presented to three recipients: Martin Antony (Psychology), Daolun Chen (Mechanical and Industrial Engineering), and Michael Kolios (Physics).
Ryerson’s researchers are applying their expertise to improve enterprises, policies, products, and services to meet societal needs.

Ryerson’s culture of innovation fosters research with real-world impact. Our research and innovation strategy includes Scholarly, Research and Creative (SRC) partnerships with industry, government, and not-for-profit organizations. The Office of the Vice-President, Research and Innovation (OVPRI) connects researchers with companies to align academic research with industry needs. This collaborative approach to innovation provides our partners with access to world-class expertise, and Ryerson students with ‘real’ experiences, helping to build the pipeline of highly qualified, future leaders.

Ryerson’s inter-disciplinary research centres, institutes, and innovation zones strongly support such collaborative research and commercialization activities. Ryerson’s researchers are applying their expertise to improve enterprises, policies, products, and services to meet societal needs. Ryerson’s SRC achievements extend beyond research funding to include commercialization and knowledge mobilizations activities, which are highlighted in this section.
Ryerson has 28 research centres and institutes as well as a wide range of specialized labs that are focused on advancing interdisciplinary scholarship and driving innovation across a wide range of themes. Researchers at our centres and institutes are using collaborative research methods to partner with industry, government, and not-for-profit organizations to address existing, real-world challenges.

Through our world-renowned interdisciplinary incubation zones, Ryerson brings together students, faculty, and industry partners to solve complex research problems, providing students with meaningful experiential learning opportunities by working with industry experts or launching their own ventures. In 2012-13, Ryerson supported 194 start-up companies, 71 of which were incubated in the Digital Media Zone (DMZ).

Based on the success of the DMZ, Ryerson launched the Innovation Centre for Urban Energy (CUE) in November 2012. Based in the Centre for Urban Energy (CUE) – a unique, multi-disciplinary research and innovation centre dedicated to solving urban energy issues in Canada – i-CUE is focused on green entrepreneurship, helping new energy companies turn their ideas into viable commercial products, services, and technologies.

In December 2012, Ryerson opened the Ryerson Centre for Cloud and Context-Aware Computing (RC4) dedicated to creating knowledge, commercializing research, and creating jobs to improve productivity and performance in Southern Ontario.
Knowledge Mobilization (KM) is an important part of the research process that takes place within a complex system of interactions between researchers and knowledge users. KM principles – applying knowledge to action to help advance practical impact on policy and society – are deeply embedded into Ryerson’s mission to solve real world problems and serve societal needs.

Ryerson faculty, students, and staff are also engaged in a variety of KM and commercialization activities to improve products, services, policies, and communities, including conference presentations, café scientifiques, art exhibitions, lectures and panels, educational workshops, industry networking events, and open-editorials and news releases.

PuBlICATIONS AND CITATIONS

Ryerson’s total number of academic publications produced by faculty members, and the number of times they are cited in other publications, are two indicators of successful SRC performance.

In 2012-13, the total number of academic publications by Ryerson researchers has increased by 5.5% from the previous year. In addition to publication productivity, Ryerson researchers were cited 6023 times by other scholars, a 28% increase from 2011-12. Ryerson’s growth in publications and citations over the past five years reveals a steady upward trend in the University’s research impact.

FROM IDEA TO MARKETPLACE

Ryerson is leading the way in research-driven entrepreneurship, supporting opportunities for rising innovators and advancing economic development through spin-off companies and job creation. The Office of the Vice-President, Research and Innovation (OVPRI) serves as a portal for private sector collaborations and a launch pad for commercially viable inventions and concepts.

Each year, the Applied Research and Commercialization Unit at the OVPRI helps researchers to negotiate industrial contracts, file patents, and actively promote Ryerson’s technology and expertise. In 2012-13 Ryerson researchers filed a record number of invention disclosures for patent protection. Through our SRC activities, over 200 student-led applied research projects and social innovation jobs were created. More information on work placements is available in the Building the Next Generation section.

HIGHLIGHTS

200 +
Over 200 student-led applied research & innovation jobs

26
Invention disclosures applications at Ryerson

9
New Patent Filings

SOURCE: Office of the Vice-President, Research and Innovation
Ryerson actively promotes ‘learning by doing’ and real-world engagement through applied research projects or internships.

BUILDING THE NEXT GENERATION

Ryerson University is committed to building the capacity of our future leaders, and our students have been recognized for their active participation and research excellence.

Known for the creation of our innovative ‘zone’ model of education, Ryerson actively promotes ‘learning by doing’ and real-world engagement. We are providing students with scholarly training as well as on-the-job experiences and career-relevant skills through applied research projects or internships, both within the university and with industry partners.

The University’s holistic approach to education helps our students gain critical thinking, analytical, and practical skills that prepare them well for future pursuits in entrepreneurship, research, or employment in the private, public, and non-profit sectors.
UNDERGRADUATE RESEARCH OPPORTUNITIES (URO) SCHOLARS

In the spirit of Ryerson’s mandate to provide our students with real-world experience, the URO scholars program allows high-performing undergraduate students (with a minimum cumulative GPA of 3.5) to conduct research with a Ryerson faculty member over the summer. Similar to graduate projects, these faculty-mentored projects provide students with the opportunity to engage in real-world research activities that prepare them to pursue postgraduate studies or transition into the workplace.

The URO Scholars program marked its third anniversary in Summer 2012, during which 50 participants each received $6500 for their work over a 12-week period. Placed in 29 different schools and departments across campus, students worked on a broad range of Scholarly, Research and Creative activities and projects, many earning co-authorship on research papers or conference presentations.

FEDDEV ONTARIO

FedDev Ontario targets investments to create jobs, strengthening the southern Ontario economy and positioning the region as a strong force on the global scale. The Agency sponsors two programs that support capacity building for the next generation: the Graduate Enterprise Internship (GEI) program and the Scientists and Engineers in Business (SEB) program.

The GEI program is designed to support the development of highly skilled workers in southern Ontario by providing graduate students and recent alumni of science, technology, engineering, and mathematics (STEM) programs with business and management experience in small- and medium-sized enterprises. In 2012-13, the GEI program created 57 internships for new Ryerson graduates.

The SEB program supports the development of business and management skills of entrepreneurs in STEM fields, helping them successfully launch their own businesses or careers in the region. Through this program, Ryerson added 15 commercialization fellowships in 2012-13.

MITACS

Mitacs receives government funding to provide research and training programs for graduate students and postdoctoral fellows. Participants conduct collaborative research between their University and a company or organization of their choice, applying their specialized research expertise to business research challenges while gaining real-world experience. In 2012-13, Ryerson created 48 internships for Master’s and doctoral students through Mitacs-Accelerate, and 9 fellowships through the Mitacs-Elevate program.

Mitacs also provided interactive workshops on entrepreneurship and business-related topics to 84 Ryerson students and fellows through the Mitacs-Step program, and offered funding support for other networking and training purposes.

NETWORKS OF CENTRES OF EXCELLENCE

The Networks of Centres of Excellence (NCE) program supports large-scale, academic research networks that harness the creativity and inventiveness of Canadian health science, natural science, social science, and engineering researchers. NCE administers Connect Canada, a national internship program that links Canadian companies with graduate students and postdoctoral fellows for research internships. Through this program, Ryerson created several research placements for students in collaboration with partners such as Toronto Hydro, Hydro One, and Ontario Power Authority.

SOURCE: Office of the Vice President, Research and Innovation
New partnerships with leading institutions help to build our research capacity and enhance our academic mission.

Ryerson’s reputation continues to grow globally. International engagement, including the exchange of visiting researchers and students, as well as faculty-to-faculty collaboration on projects and publications, serve to enrich our institution.

New partnerships with leading institutions help to build our research capacity and enhance our academic mission. The alignment of Ryerson’s international goals with those of the federal and provincial governments have led to close relationships with Canadian embassies, consulates and high commissions abroad, as well as the Ontario International Marketing Centres. Ontario government ministries routinely include a visit to Ryerson on the itineraries of visiting international delegations, building our profile and enhancing our reputation.

Ryerson University’s international strategy continued to evolve in the 2012-13 fiscal year. Our ‘Internationalization Framework’ was approved by the Ryerson Executive Group and Academic Planning Group. The framework identified key priorities, such as pursuing partnerships and collaborations, enhancing learning opportunities, supporting SRC activities, attracting high-quality graduate students, and continuing to build Ryerson’s reputation internationally. The University continues to welcome opportunities for collaboration around the world with new partnerships.
Ryerson has 120 partnerships with academic institutions around the world, facilitating a range of activities such as the exchange of students, collaborative research, and cooperation on international development projects.

Ryerson hosted 220 inbound students and sent 167 outbound students to 20 countries, under bilateral exchange agreements with partner academic institutions. As a mark of Ryerson’s growing international reputation, our institution continues to be a destination of choice. In 2012-13, 53 visiting researchers from 15 countries came to Ryerson to participate in an existing or new research program under the supervision of a Ryerson faculty member.

Beyond academic exchanges with partner academic institutions and hosting visiting researchers, Ryerson also facilitated other opportunities for students to gain world perspectives through programming such as international fieldtrips, short-term internships for course credit, and conferences. In 2012-13, 99 students participated in international internships, 82 students participated in overseas conferences, and 265 students participated in field trips abroad.

### Highlights

- 120 Partnerships
- 17 New Partners
- 220 Inbound Exchange Students
- 167 Outbound Exchange Students
- 50 Visiting Researchers

### Ryerson’s International Partnerships

**Source:** Ryerson International Database, Ryerson University

#### HIGHLIGHTS

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<th>Country</th>
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<th>Outbound Students</th>
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### INTERNATIONAL PARTNERSHIPS

Ryerson has 120 partnerships with academic institutions around the world, facilitating a range of activities such as the exchange of students, collaborative research, and cooperation on international development projects.

Ryerson hosted 220 inbound students and sent 167 outbound students to 20 countries, under bilateral exchange agreements with partner academic institutions. As a mark of Ryerson’s growing international reputation, our institution continues to be a destination of choice. In 2012-13, 53 visiting researchers from 15 countries came to Ryerson to participate in an existing or new research program under the supervision of a Ryerson faculty member.

Beyond academic exchanges with partner academic institutions and hosting visiting researchers, Ryerson also facilitated other opportunities for students to gain world perspectives through programming such as international fieldtrips, short-term internships for course credit, and conferences. In 2012-13, 99 students participated in international internships, 82 students participated in overseas conferences, and 265 students participated in field trips abroad.

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The Scholarly, Research and Creative (SRC) Activity Advisory Committee is representative of the research enterprise across Ryerson. The Committee is the leading venue for discussion, advice, and guidance of the strategic research issues and directions of the university. The Committee also addresses all aspects of the research enterprise, including basic and applied research, knowledge translation, commercialization, and industry.

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Ryerson would like to sincerely thank its 2012-13 research partners:

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Astra Zeneca
Atlantic Canada Opportunities Agency (ACOA)
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