

GLOBALLY-RECOGNIZED CLUSTERS IN THE TORONTO REGION: IT SECURITY & CRYPTOGRAPHY

THE TORONTO REGION IS ...

- The third largest ICT cluster in North America with a workforce of more than 101,000, and major multinational corporations such as IBM Canada, Pitney Bowes, Alcatel-Lucent, Research in Motion, Xerox Canada, and COM DEV
- A growing hub of more than 70 companies that provide IT security products and services, including industry leaders such as: Bioscript, Certicom Co., Cisco Systems Canada, Digital Cement, IBM Canada, McAfee Canada, Microsoft Canada, Open Text Corporation, Pharma Algorithms, SAP Canada, Symantec Canada, Teranet, and Thomson Reuters
- The fourth largest financial services cluster in North America with a sophisticated customer base that includes major financial institutions such as the Royal Bank of Canada, Manulife Financial, and Toronto Stock Exchange, to name a few
- Home to the University of Toronto and the University of Waterloo which are ranked among the top 10 universities in North America and are the top two Canadian universities to publish articles relating to IT security and cryptography
- Producing a highly-educated and highly skilled workforce – over 5,000 graduates (at all levels) from key university and college programs in 2007

ADVANTAGES

- A world-leading economic region:
 - Ranked #1 for the soundness of its banking system by World Economic Forum (Global Competitiveness Report 2008-2009)
 - Ranked #3 in North America by MasterCard's Worldwide Centres of Commerce (2008)
 - Ranked #7 Top City Regions of the Future by Foreign Direct Investment magazine (2009)
 - Ranked #10 of the World's Top Global Cities (Global Cities Index (2008)
 - Ranked #10 most economically powerful city by Forbes.com (July 2008)
- 7.4 million people live in the Toronto Region, making it the 4th largest urban region in North America
- Immigration responsive to company needs:
 - Uncapped number of work permits available to foreign workers
 - Process for intra-company transfers is fast and straightforward
 - Special programs allow employers to permanently recruit high-end research staff and other workers within defined occupations
- Business-friendly environment:
 - Canada ranked #1 in number of procedures required to start a business, and #2 in time required to start a business (World Economic Forum, Global Competitiveness Report 2008-2009)
 - Ranked #4 globally for Ease of Doing Business by MasterCard Worldwide Center of Commerce Index (2008)
 - Canada's largest centre for research and education – location for 35% of all R&D conducted in Canada
 - Highly-skilled workforce of 1.8 million (25-64 years of age) drawn from the most educated population in the G8: 64% hold a post-secondary degree or equivalent
- Part of a well-developed transportation infrastructure – air, rail and highway corridors – that easily moves people and goods to cities in the US Midwest and Northeast

WORLD-CLASS RESEARCH AND EDUCATION

- Toronto Region universities are a hub of research excellence recognized by the major Canadian granting councils
 - Natural Sciences and Engineering Research Council (NSERC) awarded \$7.1 million to IT Security and Cryptography related projects, 1999 - 2009
 - Canada Foundation for Innovation awarded \$1.3 million to IT Security and Cryptography related projects, 1999 - 2009
 - 7 of 23 Canada Research Chairs in IT Security and Cryptography
- Is ranked the #5 region in North America for scientific impact based on number of citations per publication
- Over 160 computer science, engineering and mathematics programs (at all levels) are offered at Toronto Region universities and colleges/institutes

“...So just in terms of scale...and focus on computer science, Waterloo stands out, even on a global basis stands out very, very well...There are many years where Waterloo is the university we hired the most people from of any in the world, and Waterloo has always been in the top five every year...”

Bill Gates,
Founder and Chairman, Microsoft Inc.

- A centre of advanced research and development based in Toronto Region universities, including:
 - **McMaster University:** Centre for Electrophotonic Materials and Devices
 - **Ryerson University:** The Privacy and Cyber Crime Institute
 - **University of Ontario Institute of Technology:** Hacker Research Lab
 - **University of Toronto:** Fields Institute for Research in Mathematical Sciences, Emerging Communications Technology Institute; Knowledge Media and Design Institute; Bell University Labs; Institute for Knowledge Innovation and Technology; and Centre for Quantum Information and Quantum Control
 - **University of Waterloo:** Institute for Quantum Computing; Canadian Centre of Arts and Technology; Centre for Applied Cryptographic Research; Institute for Computer Research; Centre for Computational Mathematics in Industry and Commerce; Giga-to-Nanoelectronics (G2N) Centre; and Pattern Analysis and Machine Intelligence (PAMI)
- World-class independent research centres include: Canadian Institute for Advanced Research (CIFAR); Perimeter Institute for Theoretical Physics; and Guelph-Waterloo Physics Institute (GWPI)

Top 10 Publishers (North America) on Computer Fraud, Risk and Security and Cryptography by University from 2000-2009

Institution	Number of publications
Harvard University	180
University of Texas	133
University of Waterloo	124
University of Toronto	118
University of Maryland	114
University of Illinois	113
Purdue University	110
University of California, Los Angeles	109
University of Washington	109
Stanford University	108

Source: ISI

WEB LINKS

Toronto Region Research Alliance
www.trra.ca

McMaster University
www.mcmaster.ca

Ryerson University
www.ryerson.ca

University of Ontario Institute of Technology
www.uoit.ca

University of Toronto
www.utoronto.ca

University of Waterloo
www.uwaterloo.ca

Canadian Institute for Advanced Research
www.cifar.ca

Perimeter Institute for Theoretical Physics
www.perimeterinstitute.ca

Fields Institute for Research in
 Mathematical Sciences
www.fields.utoronto.ca

“The Toronto Region is home to one of the largest and most productive concentrations of research and development talent in the world, and serves as a portal to all of North America’s major markets and institutions.”

Dan Fortin,
 President, IBM Canada Ltd.

Leading Regions in North America for Computer Fraud, Risk and Security, and Cryptography related Publications and Citations, 2002 - 2009

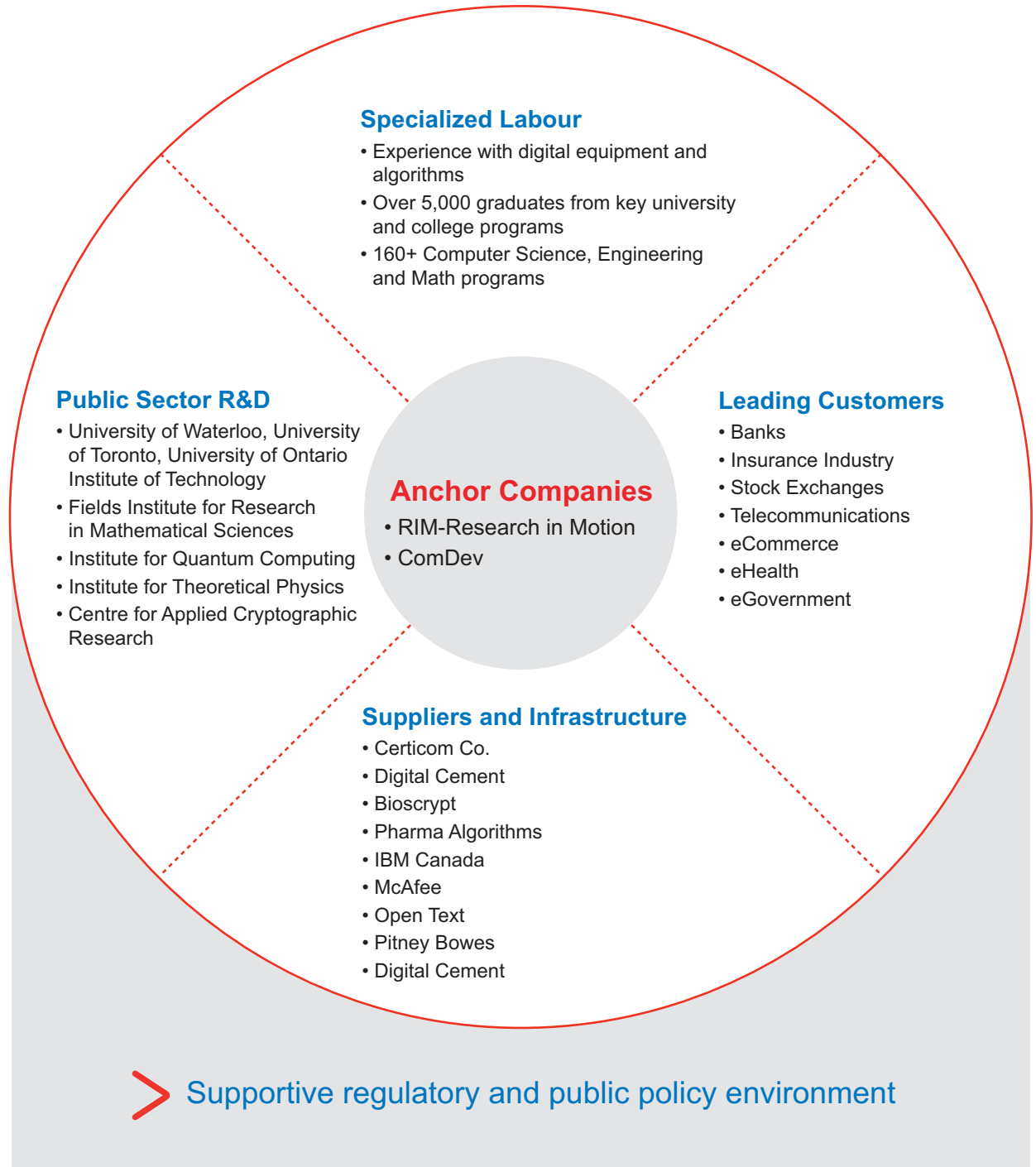
Region	Citations/Publication
Massachusetts	12.49
California	12.27
Illinois	12.20
New York	11.39
Toronto Region	9.89
Minnesota	9.41
North Carolina	8.94
Virginia	7.89
Connecticut	7.11
Pennsylvania	7.02
New Jersey	5.39

Source: ISI

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IT SECURITY & CRYPTOGRAPHY IS A KEY R&D CLUSTER IN THE TORONTO REGION



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Based on research undertaken by The Boston Consulting Group