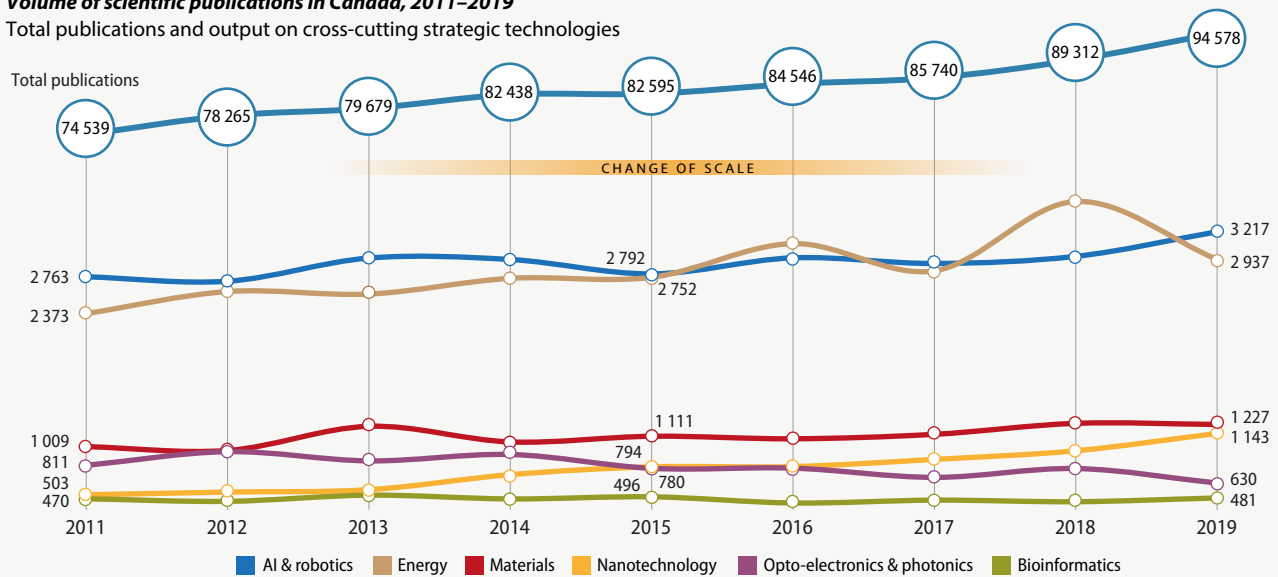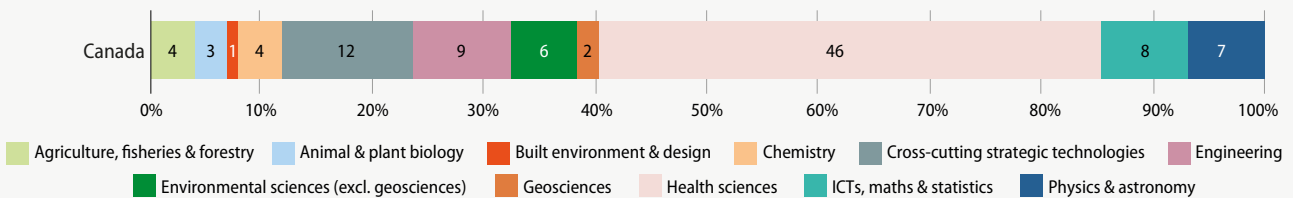# Figure 4.3: **Trends in scientific publishing in Canada**

Volume of scientific publications in Canada, 2011–2019
Total publications and output on cross-cutting strategic technologies

Total publications

| 74 539 | 78 265 | 79 679 | 82 438 | 82 595 | 84 546 | 85 740 | 89 312 | 94 578 |

CHANGE OF SCALE

2 763
2 373

2 792
2 752

1 009
811
503
470

1 111
794
496 780

3 217
2 937

1 227
1 143
630
481

2011 2012 2013 2014 2015 2016 2017 2018 2019

■ AI & robotics ■ Energy ■ Materials ■ Nanotechnology ■ Opto-electronics & photonics ■ Bioinformatics

Scientific publications in Canada by broad field of science (%), 2017–2019

| Canada | 4 | 3 | 1 | 4 | 12 | 9 | 6 | 2 | 46 | 8 | 7 |

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ Agriculture, fisheries & forestry   ■ Animal & plant biology   ■ Built environment & design   ■ Chemistry   ■ Cross-cutting strategic technologies   ■ Engineering
■ Environmental sciences (excl. geosciences)   ■ Geosciences   ■ Health sciences   ■ ICTs, maths & statistics   ■ Physics & astronomy

56%
Share of publications with foreign co-authors in Canada, 2017–2019; the OECD average is 34%

1.38
Average of relative citations for Canada, 2014–2016; the OECD average is 1.11

How has output on SDG-related topics evolved since 2012?

Canadian researchers published more on several topics related to biodiversity and climate change than would be expected, relative to global averages, including carbon pricing and carbon capture and storage. Putting a price on carbon is a cornerstone of the *Pan-Canadian Framework on Clean Growth and Climate Change* (2016).

The intensity of output on the use of ecosystem-based approaches in protected areas was even five times the global average, despite modest numbers: 94 (2012–2015) and 88 (2016–2019) publications. Researchers also published 3.1 times and 1.7 times the global average on the local impact of climate-related hazards and disasters and on strategies to mitigate such hazards, respectively.

The intensity of output was no higher than would be expected, however, on traditional knowledge, cleaner fossil fuel technologies and industrial waste management, despite the logistical and environmental challenges of waste management in the Athabasca oil sands.

With the exception of growth in publications on smart-grid technologies from 1 328 (2012–2015) to 1 869 (2016–2019), output on renewable energy technologies remained modest; it was even half the global average intensity for photovoltaics: 857 (2012–2015) and 950 (2016–2019).

For details, see chapter 2

Scientific publications per million inhabitants in Canada, 2011, 2015 and 2019

2011: 2 158
2015: 2 293
2019: 2 528

Canada's top five partners for scientific co-authorship, 2017–2019 (number of papers)

	1st collaborator	2nd collaborator	3rd collaborator	4th collaborator	5th collaborator
Canada	USA (65 364)	China (26 604)	UK (22 433)	Germany (15 721)	France (15 318)

Source: Scopus (excluding Arts, Humanities and Social Sciences); data treatment by Science-Metrix