Compute Canada Allocates More Than $134 Million Worth of Powerful Computing Resources To Support Canadian Researchers

Researchers are harnessing the power of supercomputers and data centres across Canada to tackle national-scale research challenges

Ottawa, ON (January 17, 2014) - Compute Canada Calcul Canada (CC), Canada's national platform of High Performance Computing (HPC) resources, today announced grants of more than $134 million worth of state-of-the-art computing, storage, and support resources allocated to 271 leading-edge Canadian research projects across the country.

These competitively-awarded grants will allocate more than 1.2 billion processor hours and 12 petabytes of storage to the projects over the next year. Researchers will also have direct access to CC's distributed team of technical experts, who are critical to enabling the efficient use of these state-of-the-art HPC systems. CC's national platform of resources represents close to two petaFLOPs of compute power, which is equal to two quadrillion calculations per second, and more than 20 petabytes of storage, equivalent to more than 400 million four-drawer filing cabinets filled with text.

"The value of these grants goes far beyond their financial worth," said Dugan O'Neil, Chief Scientific Officer. "These incredibly powerful computing tools and our network of experts are helping Canadian researchers develop and improve products, inform public policies, contribute to sustainable job creation, and make discoveries that help us better understand the world around us."

The projects — which range from aerospace design and climate modeling to medical imaging and nanotechnology — produce results and breakthroughs that in many cases simply wouldn't be possible without CC's resources.

For example, at Dalhousie University in Halifax, NS, Associate Professor Katja Fennel is studying how global carbon and nitrogen cycles are altering fundamental physical and chemical properties of the ocean. Access to CC enables her research team to run computationally-intensive numerical models that accurately simulate the physical, chemical and biological processes in the oceans, helping paint a better picture of the effects on marine food webs, the ocean's capacity for carbon uptake, and species of commercial importance, such as fish, bivalves and crustaceans.

“Biogeochemical models are and will continue to be essential tools in assessing, understanding and projecting the environmental changes affecting coastal and open ocean ecosystems,” said Fennel. “Further development of these tools is of global relevance and of strategic importance for Canada given its long coastline, its dependence on coastal resources, and its commitment to implementing an ecosystem approach to ocean resource management.”

At McGill University in Montreal, QC, Dr. Alan Evans is leading a number of projects in the area of “brain mapping”, which refers to the combination of brain imaging with sophisticated computational analysis to capture 3D maps of neuroanatomy and neurophysiology. Evans’ lab has developed an algorithm for the extraction of 3D surfaces of the brain cortex, the folded outer sheet of neurons where computation occurs, and compare it in normal versus diseased states across thousands of people.

“Every year, our datasets get larger in cohort size and scan resolution,” said Evans. “Our team cannot grow local infrastructure and support scientists with research problems at the same time. Compute Canada allows us to focus on the research by covering our growing computing needs.”

In Toronto, ON, Professor Paul Kushner relies on CC infrastructure to better understand and solve the complex mathematical equations that govern the climate system and its dynamics. To do this work, Kushner’s Atmospheric Physics research group at the University of Toronto uses sophisticated computer models, sharing and collaborating on them with an international community of climate scientists.

“In this research, Compute Canada infrastructure is critical,” said Kushner. “Without state of the art high performance computing facilities like those provided by Compute Canada and SciNet, University researchers like us could not carry out cutting-edge research with computer models of climate.”
On the West Coast, Assistant Professor Irina Paci’s research focuses on the self-assembly of molecules at solid surfaces, a central issue in nanoscale device fabrication. Access to CC is key for this University of Victoria researcher. The materials she studies show promise for use in a variety of applications, such as dielectrics in field-effect transistors and supercapacitors, or as fiber-optic materials. These are complex systems, however, and theoretical investigations of their assembly and properties are difficult to perform using current simulation methods.

“We expand the current understanding of the role of the molecular environment on self-assembly while creating better simulation methods, developing user-friendly computer packages, and training young scientists in an array of theoretical methods,” said Paci. “The research would not be possible without Compute Canada infrastructure because the datasets we work with are very large and require highly parallelized calculations on machines with fast connectivity.”

The institutions and resource centres that comprise CC are hubs of interdisciplinary computational research, connected from coast to coast by the high-speed national CANARIE network and regional advanced networks. Together, these distributed computing facilities work collaboratively to provide the expertise and resources necessary to give Canada’s researchers and innovators access to these world-class technologies.

CC’s resources are granted based on scientific merit and computational need.In addition to these grants for above-average computing requirements, thousands of other Canadian researchers regularly use default allocations of CC resources to support their research.

Compute Canada Calcul Canada can arrange media interviews with the 2014 Resource Allocation project contacts. For more details on this, please contact communications@computecanada.ca.

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2014 Resource Allocation Recipients

A PDF version of the complete list of resource recipients can be found here.