



Canadian Astronomical Society Soci t  Canadienne d'Astronomie

Inc. 1983

Department of Physics, Engineering Physics and Astronomy, Queen's university,
Kingston, ON K7L 3N6, Canada

Fax: (613) 545-6463 Email: casca@astro.queensu.ca

To: Dr. Andrew Woodsworth, Chair, Compute Canada Board;
Compute Canada Expert Committee

Proposal to Include CASCA Representation on the Compute Canada Board.

The Canadian Astronomical Society / Soci t  Canadienne d'Astronomie (CASCA) is one of Canada's most active and highest-profile professional societies. As part of its mandate, CASCA reviews and oversees current efforts and future priorities as they pertain to astronomical research facilities. Through membership in the Coalition for Canadian Astronomy, CASCA is actively involved in governmental lobbying aimed at securing the funds required to meet the community's needs.

Astronomy has always been one of Canada's "big users" of computing, and has often been a driver for the creation of Canadian HPC resources. Astronomy is currently one of the top five disciplines by Compute Canada CPU usage, and uses a very large fraction of Compute Canada resources. This usage has long been driven by a disciplinary tradition of innovative large-scale simulation.

The nature of astronomical computing is changing rapidly. As discussed in the 2010-2020 Long Range Plan for Canadian Astronomy¹, which prioritizes astronomical research for the next decade, the dawn of large survey projects poses both enormous opportunities and tremendous computational challenges. The Square Kilometer Array (SKA), for instance, may produce up to an exabyte of data a day, requiring enormous computing power. The proposed Thirty Meter Telescope (TMT), will generate similar quantities of data.

Canada's involvement in the SKA and TMT, as well as other ambitious projects, is substantial. Ensuring that the Canadian community maintains its well-earned world-class standing in the international astronomical scene requires both "big-data" type capabilities for data analysis, and new and innovative large-simulation resources needed to perform the exquisitely-detailed

¹ http://casca.ca/lrp2010/11093_AstronomyLRP_V16web.pdf

computations necessary to compare theoretical models to the unprecedented influx of observational data.

Individual Canadian astrophysicists have often enjoyed excellent, if informal, relationships with their local Compute Canada centres and staff. The success of this approach is reflected in the work of individual research groups as well as in larger scale endeavours. What is missing, however, is a mechanism to allow for systematic, nation-wide coordination between computing resources (overseen by Compute Canada) and the long-term needs of the Canadian astronomical research community (overseen by CASCA). We believe such mechanisms would be provided by the inclusion of CASCA within the Compute Canada governance. Other professional societies that make heavy use of computational facilities might seek similar status.

The present lack of national-scale coordination between the research community and computational priorities is more than an abstract concern. As a concrete example, the Canadian Advanced Network for Astronomical Research (CANFAR) is both a success of the current approach and a warning sign. Initially a CANARIE funded NEP partnership between the Universities of Victoria, British Columbia and the National Research Council (NRC), and now maintained by NRC, CANFAR provides an astronomy specific access layer onto Compute Canada (via Westgrid) storage and computing resources. The use of any data produced by Canadian ground telescopes, and Canada's contribution to the Hubble Space Telescope data efforts, now rely on CANFAR. CANFAR has become a critical piece of the Canadian astronomy landscape, but the project — and its impact on Canadian astronomy — rests uneasily on a year-to-year allocation process and is performed working with a single, regional, consortium. Projects of such national importance, using resources of national scale, must be coordinated nationally.

A model whereby a professional society such as CASCA is involved in the governance of the entity entrusted with coordinating and setting priorities for computational facilities is standard practice in other countries. For instance, two organizations that are in some ways analogous to Compute Canada — PRACE in the EU, and XSEDE in the US — have built input from the stakeholder scientific communities into their governance structures. XSEDE has both a Science Advisory Board, consisting of a number of computational scientists, and a User Advisory Committee; PRACE has a Science Steering Committee and an Access Committee, both composed of researchers from the nations and disciplines involved. Similarly, we believe that including representatives from CASCA (as well as other professional societies) in the Compute Canada Board would greatly aid the governance practices of Compute Canada. Having representatives expressly charged with representing entire disciplines, and tied into the decision-making process of the societies, will enable higher-level coordination and prioritization than possible in the current structure.

Our proposed plan would lead to significant and immediate benefits, by enabling Compute Canada to coordinate computing resources with the needs of national-level research, thus enacting a coherent long term vision and aligning national resources to national research priorities. This contrasts sharply with the current model, based on the annual NRAC call for resources, which is necessarily very short-term in nature and focuses purely on individual research projects. A formal inclusion of CASCA in the Compute Canada governance structure would allow national prioritization of resources at a time of rapid change of both research needs and computing technology, thus improving long-term, nation-wide planning and prioritization of

current and future Compute Canada resources. Additionally, it would enable Compute Canada to access CASCA's resources, including, but not limited to, a voice into lobbying activities through the Coalition for Canadian Astronomy, as well as outreach efforts to engage the public on the importance of HPC and Compute Canada for astrophysical research.

On behalf of the CASCA Board, I appreciate this opportunity to contribute to the Expert Committee's deliberations, and I thank you for your time. Please do not hesitate to contact me if you wish to discuss the issue further.

Best regards,

A handwritten signature in cursive script, reading "Laura Ferrarese", followed by a horizontal line.

Laura Ferrarese
President, the Canadian Astronomical Society
5071 West Saanich Road
Victoria BC V9E 2E7
Laura.Ferrarese@nrc-cnrc.gc.ca