

Atmosphere Related Research in Canadian Universities (ARRCU): Workshop on Academic-Government Partnerships

Main Workshop

January 20, 2017, Faculty Club, University of Toronto

Attendees:

In person: B. Christensen, P. Kushner, Sylvie Roy, Gilbert Brunet, Pierre Gauthier, Nicolas Grisouard, Dylan Jones, Charles Lin, Oya Mercan, Paul Myers, Thomas Pietukowski, Marjorie Shepherd, Robert Sica, Kim Strong, Peter Taylor, Kaley Walker, Ulrich Wortman.

Online: Altaf Arain, Jing Chen, Donna Kirkwood, Jane Liu, Rebecca Saari

Agenda:

10:00-10:30: Introduction

10:30-12:00: Partnerships, Infrastructure, International Connections

12:00-13:00: Lunch (provided)

13:00-14:45: Education, PARRC, Quantifying university capacity/Appendix material

14:45-15:00: Break

15:00-16:00: Conclusion

Workshop Debrief

January 21, 2017, Department of Physics, University of Toronto

Attendees: Bowen, Kushner, Brunet, Myers, Piekutowski, Shepherd.

Workshop Summary

Introduction/Partnerships Section of Focus Paper

The main purpose of this workshop was to discuss the first draft (dated January 13, 2017) of the ARRCU focus paper on academic-government partnerships (AGP). The slide deck discussed at the meeting can be found here <link to slide deck>. The following summary for the most part follows the document structure but records several discussions that informed the strategic planning process as a whole.

Paul Kushner provided an overview of ARRCU and its current activities. The ARRCU effort has been formally endorsed by NSERC and CMOS, and the initiative is seeking other endorsements. He then outlined the strategic planning process and the production of the focus paper on academic government partnerships (AGP).

A key question that arose from the initial discussion was the need to determine a target medium for dissemination and to create an executive summary. This was also discussed at the end of the workshop. This discussion is summarized in the *Next Steps for the Focus Paper* section.

The leadoff discussion continued on the issue of the need to better emphasize *fundamental research*. It was agreed that for both university and government scientists, higher risk fundamental research not tied to specific transitory government priorities is important. A general discussion on what constitutes fundamental research followed, with a range of views on the boundaries and how much space in the focus paper should be devoted to this topic. On the government side, there was support for identifying core science problems that cross applications and disciplines and that require broad vision to implement. For example, in the current ECCC plan there is an identified need for *Foundational Knowledge* – fundamental research which would have societal relevance. The foundational knowledge concept overlaps to some extent with the fundamental research concept used in universities. This topic is also part of an ongoing discussion at NSERC which is highlighting the so-called “Discovery Continuum”. At the end of the workshop, it was proposed that the ARRCU Working Group develop a paper on fundamental research needs as a culminating focus in the strategic planning process.

On the question of whether the AGP summary in Figure 1 should be substantially modified or expanded, there was no single consensus, but people emphasized that a more schematic version should exist. One suggestion was to turn Figure 1 upside down so as to first identify the applications required and then identify the research required to address them. It was felt that good continuity with the White Paper was important for the AGP focus paper, so that it might not be advisable to redraft Figure 1 in this way for the focus paper. However, for the executive summaries and schematics an alternative format could be used.

It was asked what happened to the research priorities that were listed in the White Paper, which are absent in the AGP Focus Paper draft. It was agreed that the AGP focus paper should include these priorities since their development in the White Paper required considerable effort.

The group briefly discussed the nature of research programs and mechanisms for supporting partnerships, but there was agreement that a range of size of programs, from small projects to large research networks, was desirable for both government and university researchers.

The following key recommendations that might be included in the AGP focus paper arose from this discussion:

- The need to emphasize fundamental research in addition to partnership research
- The need to remove barriers between university and government researchers and institutions,
- The need to include a range of partnership programs of different sizes.

Research Infrastructure

Paul Myers provided a summary of the key points of the current draft of the infrastructure section of the AGP Focus Paper. There followed a discussion on the importance to the

Canadian community of hardware and software in the area of advanced research computing, i.e. computing platforms administered by Compute Canada, as well as modeling and data assimilation software infrastructure. In the area of computing an ongoing irritant and barrier to collaboration are government server firewalls that prevent access from the academic community. This was identified as a high priority barrier to overcome.

In the area of infrastructure related to field campaigns, it was pointed out that there is good collaboration between university scientists and Department of Fisheries and Oceans (DFO) researchers. ECCC does have occasional opportunities for field work, and there was some discussion about whether these opportunities were broadly identified. It was stated that ECCC has occasional opportunities for field work (e.g. recent field operations related to air quality and emissions around the Alberta Oil Sands). It was pointed out that more communication in advance for a broad community to get involved would be beneficial, and that it would be desirable to have open calls for field opportunities. If international parties were planning campaigns that governments or universities would be aware of, they could be advertised and partnership and funding opportunities identified. This opening up could also be applied to marine field work (international ship time, for example). On the government side, government management identified a need to be better alerted on international observational programs that are taking place in Canada. Better communication across the university/government divide would improve these situations.

The following key priorities emerged from this discussion.

- Removal of barriers of access to government IT infrastructure and models, including accounting for firewalls, access to data and model output archives, and working agreements on software.
- Improved communication and open calls around opportunities for field work for Canadian university scientists.

International Connections

The current draft text for the International Connections section of the paper was led by **Marjorie Shepherd**. There was general agreement on the outline of the current text.

An initial question was whether the proposed PARRC (see PARRC section) should include international membership, and it was suggested that while international participants could be invited to observe they should not have full memberships. A simple means to encourage strong international linkages was that Canadian members of international committees could be invited to contribute or sit on the PARRC. Reporting back to the PARRC could be part of the expectations or terms of reference for members of international committees like ICSU, CNC-SCOR, etc., and an equivalent for atmospheric science would be a good expectation for this community. The question of funding of international participation (for example, for travel) was raised. There is no clear resolution of the issue of how participation in international panels should be funded and this was identified as a barrier that should be resolved. CNC-SCOR, for example receives a budget of \$20K/year from DFO.

It was also discussed how to best list international organizations, including keeping an up to date list of committees and opportunities. For now input on the current list will be sought and this will determine the final form of the list for the focus paper.

Out of this discussion, the following key recommendations arose:

- Include international input on PAARC via existing committee memberships on international committees;
- Explore mechanisms to nominate both academic and government scientists to international committees;
- Explore mechanisms for funding academic participation in international committees and other activities.

Education/training

An overview of the current draft section was led by **Paul Myers**. Suggestions were made on expanding this section to include discussion on how to best train university researchers to participate in policy work. In addition, it was proposed that the ARR community become a resource for climate literacy for professionals interested in policy development, scientific advisor roles, and science program manager.

There was also a sense that the universities need to obtain and share better information about government based research opportunities and train students to take advantage of those opportunities. As part of the AGP partnership there is a need to identify specific areas of gaps in education and programs. As an example, universities like the University of Toronto have collaborative programs involving policy or other disciplines combined with environmental science. To overcome the challenge of communicating to University students about existing job opportunities it was suggested that a regular job fair or annual market for graduates in ARR programs would provide a distinctive advantage, and that CMOS could be used to promote such opportunities (e.g. special CMOS Congress sessions on these themes).

In view of a job market under transformation and enrolment challenges across Canada in ARR programs, it was suggested that we try to link different university education programs through technology and online training (as in the UCAR COMET program). To enhance recruitment, it was suggested that the former NSERC program which provided targeted scholarships to students to study in ARR fields be revived. It was also suggested that increased academic input into postdoctoral fellowship selection in government visiting scientist programs would be beneficial to the quality of recruitment in these programs. Finally, the general idea of enhanced professional qualifications in ARR areas was discussed, along the lines of professional certifications in the engineering or meteorology domains.

Key recommendations in this section:

- Improved communication of needs and professional opportunities between academic and government partners.

- Enhanced focus on the interface between ARR and policy/advisory roles.
- Generating new opportunities for special scholarships in the ARR domain.
- Generally, more emphasis on postgraduate career planning for partners and CMOS.

Panel on Atmosphere-Related Research in Canadian Universities (PARRC)

Gilbert Brunet led this discussion which outlined the role and terms of reference for the PARRC. One immediate concern that arose was the need for this panel to function in a way that did not detract from the transparent consultative process currently underway with ARRCU. The need for balance in expertise, field, professional level (from HQP to early career to senior researcher), and diversity was emphasized. In addition, the idea of including someone at a high administrative or executive level from the universities was discussed. Another idea floated was that university members of the PARRC could eventually be elected to this role. But the main point was made that we should start small with something workable, grow later, and try to keep the effort manageable. Generally, a three-year term of membership with staggered memberships to ensure continuity was favoured. It was discussed but not resolved who the PARRC should report to. It was certainly clear that the PARRC would have a responsibility to report to the ARRCU community through sessions at CMOS and other meetings.

Two distinctive roles for the panel were emphasized, one focused on information sharing and consultation, and the another focused on proactively shaping Canadian scientific research in ARR over the planning horizon. The question of how open PARRC meetings should be was raised, and a range of possibilities were discussed. For example, the community could submit white papers to PARRC on specific research areas, or the PARRC could convene open workshops on topics of importance to weather/climate/air quality research. Such workshops would need to be convened by the universities and would be followed by smaller planning workshops to further develop specific research priorities.

Recommendations arising for this section:

- Terms of reference need to be drafted with a clear statement of objectives.
- Membership should be broadly representative and diverse.
- Target scientific areas for community workshops should be identified.

Conclusion: Quantifying University Capacity, Appendixes, Paper dissemination, fundamental research focus paper

Paul Kushner led the discussion on Quantifying University Capacity and appendix material to be included in this focus paper. There was discussion on the amount of material to include in this paper and the purpose of including quantitative detail at this point. **Dave Bowen** showed an example of using the NSERC database to search for research projects with a focus on climate change, which extended across many natural science disciplines.

The group discussed the utility of having a quick survey of our capacity at this stage, with for example a limited number of questions asked of participating groups. While there was agreement that this information would be potentially valuable, there was less agreement on exactly what should

be solicited at this stage and whether the university community would respond favourably to being surveyed without a clear end goal in mind.

The appendixes were also discussed and it was generally agreed that only strictly necessary information be included at this stage, until the community has a better sense of the needs for compiling information. For example, in the area of listing available facilities and infrastructure, it was felt that it was not currently worth generating a comprehensive list of infrastructure facilities across the university/government communities. But ARRCU input would be sought to make sure that the range of available infrastructure, international opportunities, research programs, etc. was mentioned in the document. Appendixes would be only included for information that wouldn't fit in the main body of the focus paper.

The following points arose during the general discussion on how best to disseminate the paper and indicate approval for the paper.

- There was discussion on means in addition to posting on the ARRCU website that could be used to disseminate the paper. The final paper will likely be about 15 pages long, which exceeds typical CMOS Bulletin page limits. Participants indicated they would contact CMOS to check whether some means for posting this focus paper would be possible. Publication as a white paper in *Atmosphere-Ocean* (CMOS journal) or the *Facets* journal was also discussed.
- In addition, several participants supported creating an executive summary and graphic that would summarize key points. For example, Figure 1 in the focus paper draft needs to be simplified and summarized for broad dissemination. The executive summary could be quickly shared with administrators and the public. It is critical that this documentation be available in both French and English. The strategic plan needs a pitch, in this case with a focus on AGP. This was identified as a high priority for the Panel on Atmosphere Related Research in Canada (PARRC) (see *PARRC* section).
- Participants also reviewed the issue of endorsing or approving the contents of the focus paper. It was agreed that the current wording in the document indicating that the document is non-binding but advisory was satisfactory. It was also agreed that university faculty would indicate individual agreement to the document by being a signatory, and that government institutions would indicate agreement by having representatives either be coauthors or signatories in some way to be determined.
- It was decided to be in touch with the ARRCU community with a summary of the workshop and request for specific input from the community arising from the discussion.

Finally, Kushner raised the point that the discussion of fundamental research needed to be further explored and proposed that a fourth focus paper on this theme be part of the strategic planning process.

Key recommendation arising:

- In this discussion, and in the AGP's discussion the next day, it was decided that a key action in this would be for the PARRC to design a survey on capacity that would address the partnership needs.

- For the focus paper, ARRCU community would be asked to make sure that range of facilities, infrastructure, international linkages, etc., was included in the document.
- A focus paper on fundamental research needs to be a part of the ARRCU Strategic Planning Process.

Workshop Debrief

The AGP Committee members who serve as coauthors of the focus paper met to discuss the workshop and next steps. The committee first discussed a key workshop theme arising from the discussion: to better recognize the integrative character of ARR done in government, with Earth system science as a key integrating idea. This theme needs to be achieved in academic-government partnerships.

The committee then discussed the focus paper sections:

- **Partnership mechanisms:** The committee discussed mechanisms for partnership, which was not a theme covered at the workshop. There was agreement on the committee that the document should support a range of partnership support programs from small to large projects.

A key barrier to partnership programs was identified. Namely, early career scientists or others who had not participated in CCAR and other programs typically were not aware of how to set up contacts with government agencies to engage in partnership. It was suggested that partnership engagement process should be along the lines of NSERC Visiting Fellowship to government laboratories.

The text surrounding lines 145-151 of the current focus paper draft deals with regulations surrounding HQP hires in partnership with government agencies. This text needs to be corrected to appropriately reflect these regulations.

- **Infrastructure:** A recurring issue that arose at the workshop was data sharing and access; this is a theme to be emphasized in the focus paper. It was suggested that the need for computational resources outside government computer firewalls was should be described.
- **International connections:** Here it was emphasized that the PARRC would provide the best mechanism for publicizing and coordinating international engagement in partnership programs. A key priority is determining ways for Canada to contribute to international space related earth observations infrastructure, and to input this information into EO strategy documents developing for ECCC.
- **Education:** The need to create a stronger linkage in the focus paper to teaching in the universities was identified. The need, in addition, to better define and make more transparent and competitive the postdoctoral appointment process to government agencies was also discussed. This information would be very useful for graduate curriculum development and graduate research training.
- **PARRC:** There was an extensive discussion of the PARRC.

The committee discussed other advisory/consultation bodies: The main purpose of the previous EC Heads and Chairs meetings was to share program priorities with university representatives and to identify EC recruitment needs for the next 2-3 years. The CSA advisory committees were and are intended to be focused on CSA needs.

Various suggestions related to the membership of PARRC were discussed. PARRC membership should include a range of professional levels from early career and HQP to senior. About a dozen members should be gathered, with a disciplinary balance across weather, climate, air quality, and with a professional balance across academic/non-academic. Some ex-officio membership from agencies like NSERC and CSA would be advisable. It was reiterated that liaisons with CNC SCOR, IAPSO, WCRP, IAMAS was important. It was suggested that some membership on PARRC from industry would be advisable.

The dual roles of the PARRC as 1) consultation/communication and 2) science research planning development were then discussed. It was suggested that one of the first PARRC priorities would be to sponsor workshops on key science partnership themes, e.g. Earth system model development, ocean model development, socioeconomic applications of ARR and marine research related to climate resilience. While we need to be careful not to overextend, there is a real need to make ARR community aware of research opportunities.

Overall, a growing to-do list for PARRC is being developed and these actions should be summarized in the focus paper.

- **Quantifying University Capacity/Appendixes:** The AGP Committee decided, consistent with the consensus at the workshop, that we would not carry out any survey for this document but would instead have the PARRC be tasked with designing such a survey with community input for purposes of informing partners of our capacity (and informing our own community).
- **Dissemination/communication of AGP Paper:** The AGP Committee also revisited the idea of a simple, direct executive summary with accompanying graphics, and that there needed to be continuity and consistency with the ARRCU White Paper which had been produced with a lot of community input.

It was also agreed that the ARRCU website would be a good posting point for the focus paper but that the executive summary could be published through CMOS Bulletin. Ultimately, however, it was agreed that the need for a professional document encompassing all focus papers (AGP, academic-industry partnership, education/training, fundamental research) should be produced. This will require financial support and a separate fundraising effort.