ARRCU-Education, Training, Communication and Outreach
(Draft – Paul Myers, October 1, 2019)

I. ARRCU Background

The Atmosphere Related Research in Canadian Universities (ARRCU) Working Group is an ad hoc group of Canadian university faculty who undertake research in weather, climate, and air quality under the general framework of atmosphere-related research (ARR). ARR considers the whole atmosphere, from the surface to space, and its interaction with land-surface, hydrologic, ocean, cryosphere, and space systems. Work in this area connects atmospheric and related sciences to many other areas of environmental and social science.

We have initiated a strategic planning process in Canadian ARR across the university, government, and industrial sectors. We seek to help configure academic ARR to the greatest benefit for Canada in a time of rapid environmental and socio-economic change. We believe that this process will benefit ARR activities within and outside the wide range of University departments and disciplines where ARR takes place.

To date our focus has been on issues relating to collaboration with Federal Government agencies, primarily Environment and Climate Change Canada (ECCC) and the Department of Fisheries and Oceans (DFO) together with representatives from the Natural Sciences and Engineering Research Council (NSERC). An initial "White Paper" from Aug 2016 and other documents are available on the web site, http://www.arrcu.ca/documents-2/.

While the primary focus of ARRCU relates to advancing ARR activities and collaboration within Canada, fundamental to this work is the education and training of the next generation of atmospheric scientists, communication of our work within ARRCU, to stake-holder communities and the general public as well as engagement in outreach activities that ensure the sustainability of ARR in the future.

II. Education, Training, Communication and Outreach (ETCO) Background from ARRCU White Paper

Universities have the unique mandate of being responsible for academic education, and thus contributing to the development of trained and skilled professionals needed by governmental departments as well as industry. In one sense, this can be viewed as a feeder system, with students getting their foundational learning in K-12 schools, and then continuing onto university and/or college, thereby providing government operations, industry and research with employees with the necessary expertise and skills. Given the importance of this system in providing the necessary skilled workforce, strategic planning is needed to identify strengths, gaps and mutually beneficial coordination. Because this aspect of planning also requires input from industry, and extends well

beyond issues directly related to government partnerships, we will develop a separate focus paper on this topic. But we make several points related to the role of academic-government partnerships here.

First, we believe that it is important to increase exposure to atmosphere-related science (including the physics, chemistry, and biogeochemistry of the Earth system and its components) in the present-day school curriculum. This exposure will encourage students to consider further education and careers in our fields, in a way that will allow them to productively develop their math, science, and computer programming abilities through creative hands-on research. Such exposure can be facilitated by ARRCU initiatives that raise awareness in school boards of (1) the professional opportunities for K-12 teachers to enhance their integration of ARR in the classroom and (2) the exciting employment possibilities that strong training in ARR can provide students entering the work force in academia, government, and industry.

Second, we see a need to better inform undergraduate education programs within our universities about the needs and opportunities in government-based research. This will necessarily take place on a longer planning horizon, since educational programs at universities evolve on a longer timescale than research priorities. Nevertheless, universities need to keep current on what is needed by working with atmospheric and related science professionals within government so that students graduate with the skills required to work within government agencies. We also see an opportunity for academics and government researchers to communicate their views on the trends in training requirements.

Finally, as we synthesize our priorities and strengthen our collaborations within ARRCU, education and training at the postgraduate and post-doctoral level will also need to evolve to reflect the areas of need within research and government. For students interested in the scientific research carried out in federal departments, this will ensure that their research is relevant to current and medium-term needs. For students with an interest in more fundamental research, this awareness will allow them to efficiently plan their future professional research programs and collaborations. We recommend enhancing the scope and opportunities for HQP training using various grants and contributions mechanisms in government laboratories. Additional ways to provide and facilitate internships and extended research stays in governmental labs would be beneficial. Such visits by university-based HQP would give them an understanding of the governmental work environment as well as facilitating direct interactions with government scientists and building networks. We also see a need to ensure that organizations such as MITACS, which provide government matching support for internships with industry, also provide support for internships with federal (and provincial) government departments that qualify for internship funding. Finally, we recommend facilitating HQP training through providing government scientists enhanced opportunities to serve as visiting scientists at academic institutions, thus allowing significant exchange of ideas and expertise.

Moreover, we see a need to improve the dissemination of government employment opportunities to HQP through the development of a common job posting resource and by regularly holding jobs fairs and career panel sessions at Canadian Meteorological and Oceanographic Society (CMOS), Canadian Society for Chemistry (CSC), and Canadian Association of Physicists (CAP) meetings.

Developing job market awareness while still in training will help students and post-doctoral scientists make decisions about acquiring specific skills and/or training that may help improve their career prospects. In addition, seeing the range of opportunities will be helpful for those in degree programs in professional areas like meteorology; it would, for example, provide alternative paths for employment in ARR, beyond ECCC's regular recruitment of forecasters. ARRCU has started an "opportunities" email list to publicize programs of study and research opportunities, and with moderate support this could be broadened into a more systematic postgraduate career program in ARR that would serve the needs of academics and government.

The key area for progress, therefore, is in the area of communication and coordination between university and government departments (which could include scope for partnerships between government, industry, and academia) for long-range planning in education and training in ARR. We are aware of international examples (for example, the US University Corporation for Atmospheric Research's educational programs) that show what can be gained by investing in reviewing the feeder system and its effectiveness. Regular meetings to communicate needs, trends and strengths/weaknesses of the present training system would encourage greater collaboration between different academic groups at different universities. This could, over the long term, help fill gaps in graduate and undergraduate programs for university departments that include relatively few courses and instructors.

Key Previous Recommendations

Two of the key aspects of ARR are education and training, both at the undergraduate and graduate level, as well as communication and outreach. The White Paper suggested two key recommendations in this area:

- Enhanced coordination between government and academic partners is urgently needed in the areas of education and training. This includes regular meetings to assess and undertake year-to-year planning to improve education and training programs in ARR across Canada. This could also encourage greater collaboration between different academic groups at different universities (e.g., many smaller groups/universities have difficulty running full undergraduate programs).
- We recommend exploring more ways and mechanisms for student and postdoctoral funding to engage in partnership research. The scope could be flexible and include industry, government at all levels, and non-governmental organizations.

III. Foundation Learning (K-12 school curriculum – and CEGEP)

Issue

Atmospheric Science and related disciplines such as marine sciences are often not covered to great extent in school (K-12), and what is taught is often presented within geography domain, rather than treated as a physics (or chemistry or computer science or engineering) application.

Problem

Given this, many Canadians never learn much about our science in school, meaning we have an uneducated public, yet many of the aspects of our science are critically important for Canadians. Additionally, top students with strong math/physics background rarely consider our fields when they consider what to study in university, meaning recruitment into our sciences can be difficult. So, the question is **how do we get aspects of ARR into schools, especially secondary school education?**

There is a divergence in the public school curriculum between environmental studies and environmental science. Students do not realize until it is too late that by pursuing environmental studies they are missing the quantitative skills they might need if they decide they want to do science later on.

Benefits

Including more ARR education throughout K-12 has the benefit of producing a more educated public who can understand the importance of the atmosphere, climate and the ocean to critically evaluate debates related to these issues. It also has the potential to attract a higher calibre of creative/motivated/passionate students into our undergraduate and graduate programs.

Audience

Engaging with teachers will be challenging due to provincial differences in primary and high school curriculum development. Yet there are many teachers who are interested in introducing more climate/atmospheric content into their curriculum, but they feel that they do not have adequate science background. Promoting and increasing ARRCU's engagement with existing continuing education programs for teachers and potentially expanding such offerings through on-campus outreach programs may help to integrate more ARR in the K-12 classroom.

Challenges:

The primary challenge is that it may be difficult to treat ARR as a physics (or chemistry or computer science or engineering or earth sciencve) application at the high-school level, given the relatively basic level of the physics curriculum offered in secondary schools in Canada.

Also, is there a perceived "lack of interest" in STEM fields, including ARR among secondary school students? This has potentially fostered a "lack of interest" among ARR scientists and professionals in engaging in outreach and education initiatives in secondary schools. This is a difficult challenge to overcome, yet similar challenges have been addressed by other STEM fields with some success (example?).

Solutions:

1. Targeting Teachers:

An example of a possible solution is the popular online Seminars on Science program developed by the American Museum of Natural History in NYC

(https://www.amnh.org/learn-teach/seminars-on-science).

This program offers teachers the opportunity to take courses that can be counted towards a Masters degree in Education. Current course offerings related to ARR include Climate Change and The Ocean System. Part of the course evaluation includes getting teachers to create their own modules to use in their classrooms. A similar approach could be facilitated by ARRCU by coordinating with the provincial colleges of teachers. Offering courses online and at the Specialist or Masters level will help to overcome differences in provincial professional requirements for teachers.

- Another example of a successful K-12 teacher training program is one developed by the University of Washington (link?)
- CMOS already offers teacher education workshops in atmospheric and oceanic sciences but it has had trouble getting applicants for these teaching workshops. ARRCU members plan to examine the barriers limiting the success of these workshops and the potential opportunities to promote, redesign, and expand these offerings.
- Another solution is for ARRCU to develop and maintain an online resources portal that provides teachers with foundational and project-focussed ARR curriculum that they can incorporate into their classes. Excellent K-12 curriculum resources already exist for ARR (https://scied.ucar.edu/teachers, https://serc.carleton.edu/eslabs/index.html, https://serc.carleton.edu/integrate/index.html, ; however, teachers may not know where to find them. A "one-stop-shop" might help teachers find what they are looking for more easily.

2. Targeting Students:

- ARR-focussed summer programs for K-12, like https://scied.ucar.edu/longcontent/ncar-high-school-internship-program, could be a way for ARRCU to engage with this demographic.
- E.g., many university engineering schools have invested in the development of summer education and outreach initiatives to help prepare and recruit students into STEM programs. A very successful example at the University of Toronto is the Da Vinci Engineering Enrichment Program (DEEP) (https://outreach.engineering.utoronto.ca/pre-university-programs/deep/.
- A national level outreach initiative, e.g., "Atmospheric Science Day", which would include school visits, interactive activities, short videos, group projects, citizen science opportunities, etc.
- Greater participation by the ARRCU community in programs like "Let's Talk Science/Science Rendezvous" (http://letstalkscience.ca/). Let's Talk Science is in the beginning phases of developing a comprehensive climate change curriculum. This would be a great opportunity for ARRCU help shape the development of this type curriculum.

C) Targeting Guidance Councillors:

- Providing educational/promotional materials about ARR university programs to guidance councillors.

- Arranging school visits by scientists and professionals that promote careers in ARR (e.g. “Scientists in Schools”).

IV. Undergraduate Education at Canadian Universities

Issue

Convincing university administrations about the need for ARR programs, attracting keen and bright students to our classes and programs, and dealing with low enrollments have been ongoing challenges.

Problem

A challenge (not unique to ARR) is that ARR is scattered among multiple academic units. On the bright side, despite low enrollments in a few specific ARR-degree programs, there may actually be more students involved in ARR related programs than seen at first glance. However, students that are motivated to study ARR may not be aware the breadth of ARR course offerings available across any given campus and/or may have difficulty patching together a coherent ARR program for themselves. Furthermore, structural institutional barriers between units make it difficult to develop and offer ARR-focussed degree and specialist programs across multiple academic units.

Benefits

By encouraging administrations to help break down such barriers, in order to foster cooperation across academic units in the delivery of such programs, they can help build high-calibre, robust and sustainable programs. May also help universities through development of joint courses across universities to make best use of existing resources and expertise. As a specific point, it was indicated that this approach is used by the medical physicists, and they seem to do it well.

Audience

First and foremost, university administrators, who want to see strong programs that provide support to the university’s mandate and who have the power to facilitate program development across academic units. Secondly, departments that offer general programs in environmental science (often geography departments) may be interested in developing specialist programs in ARR that emphasize a strong math and physics foundation and ARR-specific courses, while maintaining much of the breadth that is attractive to environmental science students.

Challenges

ARR is not the only "discipline” that has issues with low enrolment, keeping up with the evolving job market, securing stronger linkages with private industry and government agencies, and dealing with barriers to sharing of resources across universities and government. Researching how other disciplines at Canadian institutions have dealt with these issues, for example, specialized business schools/programs, specialized agriculture programs, and even some engineering programs, is a logical first step to help us to further articulate the challenges ahead.

An additional challenge is that many ARR programs were originally designed to satisfy requirements from ECCC and it is currently unclear whether this inherent rigidity in our programs continues to be relevant and whether it helps or hinders the health of our programs. In fact, with the reduced hiring by ECCC, maybe their requirements should not be a focus of ARR

programs in most universities. Those students who want to go to ECCC will still be able to get what they need in ARR from at least a sub-set of university ARR programs.

Certification has been brought up, but there are many questions and uncertainties there – it is uncertain if that would help or hurt (or be neutral) with respect to ARR programs. As it has been pointed out on several CMOS UPEC conference calls, many companies may not require graduates to have all of the currently required math/physics courses that ECCC requires. The strong requirement of so many math/physics courses does reduce the potential intake of students into our programs (low enrolments).

Solutions

We should encourage administrations to help break down barriers to encourage cooperation across academic units (and universities) in the delivery of ARR programs. We envision two possible paths forward: (1) increase breadth of existing ARR programs by linking to other areas of environmental sciences/earth sciences/climate/data science/marine sciences and (2) develop focussed specialist programs in ARR within larger departments, e.g. earth sciences, geography, etc. There is also the option for linking atmospheric science to computer/data science (ideas are being discussed in multiple universities how to attract computer science students into ARR, as an application of their technical skills). This is a needed area, and also would potentially attract a set of strong computationally focussed students.

With respect to ensuring that our programs meet the demand of the current job market, present ARR programs provide few opportunities for students to develop statistical and data analysis skills that are highly sought after by employers. If students do take stats/analysis courses, they are often taking courses within math and stats or computer science departments, with no clear link between the course content and careers in ARR. Thus, development of discipline-specific stats and data analysis courses would help to attract students and enhance the learning and skill-building opportunities in ARR.

Active undergraduate chapters of CMOS could be a way to get students engaged. Thus building more links to CMOS (and UPEC).

Find better ways to educate students why education in these areas relevant and useful – i.e. how to we recruit students (and at what level).

Note: Maybe we need to rethink how to host open houses?

- Joint program/courses between ‘smaller’ universities - Note: This may be as important at the graduate level as at the undergraduate - Note: some “common" courses that some universities have difficulty offering are synoptic meteorology and many aspects of numerical weather prediction. Maybe online modules may also help, including building off ECCC training material, but modified to be in a form that all universities can use. This way, all students can get somewhat “equal” training on these topics. This would also provide opportunities for students to see who uses what they are learning and get more exposure to long term applications/careers.

Additional notes not integrated above:

- Can we link programs across universities? How would that look? Given the provincial funding model, this might be most feasible within provinces.
- Should AR programs focus on weather forecasting as has been the tradition? UBC recently revised their AR curriculum to better serve the contemporary career paths of students
- Certification is not the only thing that matters - education versus training is a dilemma.
- ECCC is linked to the UCAR COMET program - can we make better use of this? http://www.comet.ucar.edu/ .

ECCC/MSC provides financial support and material to the MetEd program as part of its training activities: http://www.comet.ucar.edu/who_about_us.php - It's a formal arrangement and so I think needs to be referenced in the ETCO document. I am not sure how well known it is at this point that Canada contributes to this resource, and it seems like a great starting point for coordinating our education efforts.

Suggestion: That CMOS endorse shared curriculum for use in University programs that could be applied across many departments. This material could be shared with and contributed to by colleagues in ARRCU and UPEC, and UPEC could be responsible for evaluation and certification. A good starting point might be relevant modules from the COMET program, which ECCC has contributed to.

- To what extent do AR and Ocean undergrad programs view these programs as terminal or a gateway to graduate school? How do our programs reflect the assumption that we make?

Perhaps stop pushing so hard for the math and physics background that we want, but rather get students excited about AR and Ocean dynamics during 2nd year survey courses and labs that are based more on intuitive reasoning

- Student perspective: need clearer careers paths/options for undergraduate students in AR and Ocean.
- How do we get environmental science undergrads more engaged in AR? Minor env. sci. or specialist programs?
- How do we improve diversity in our student populations?
- What jobs are in the field, employment opportunities? Align the program to find them jobs, opportunities have to be highlighted, broadening the scopes of program.

V. Undergraduate Research and Work Experience

Issue

Undergraduate student research and work experience (including internships and co-op work terms) are generally viewed positively as providing students additional training and opportunities, while increasing their interest in ARR.

Problem

It can be quite challenging to find internships in the area of atmospheric and climate science because of the science and math background required. The extent to which internships motivate students to pursue careers or further education in ARR, will depend on the quality and direct

relevance of the internships. Some students can be disappointed that their internship placements were not more relevant.

Issues regarding Canadian citizenship is sometimes a barrier to setting up government internships. Is there a way to work with government to overcome these barriers for short-term internships?

Benefits

Students enjoy such experiences and think they get a lot out of them. They give students practical and hands on experience they may never otherwise get and gives them a taste of the work/research. Allows students to interact with professionals, grad students and researchers, providing inspiration. Also supervisors can learn about students in advance of hiring them, or recruiting them for graduate studies.

Audience

A combination of the companies to hire students, or researchers to give them research projects and the universities to allow such activities within their programs. Most universities now view such activities as a positive and support them.

Challenges

Students can go on and do well without them. There is overhead for planning. In terms of work internships, they can make degrees longer.

Solutions

Needs to be pushed, with effort put into developing government and industry partners that offer opportunities that are relevant to our interns is key. Need support from universities offices that work with such partners to help build them in ARR. Programs also need to more clearly integrate research into the curriculum.

Summer workshops for undergrads - Workshops held during reading weeks might also be an idea. Some students are working all summer, or travel back to their hometowns and wouldn't be able to participate in workshops.

Undergraduate national-level competitions. These are very popular.

VI. Post-graduate training

Issue

How to attract good students into ARR, especially those with sufficient math and physics literacy. How to find sufficient funding for such students, including costs related to field aspects. How to provide our students with a sufficient breadth of training beyond their traditional research project, including in relevant soft skills (communication, policy, outreach, etc.) as well as technical aspects like computing and big data.

Small programs can't provide breadth of training needed in all areas by modern post-graduate students.

Problem

Limited undergrad programs, so general no direct feeding into post-graduate programs. We want students with good math and physics literacy, but they often do not know enough about our area to consider it for post-graduate training, especially as the best of such students get many other opportunities. We attract (get applications) students interested in the environment and climate, but many come from backgrounds without strong numeracy and computing skills.

Small undergrad programs mean limited funding/respect from university admins that count numbers, or assign grad student funding based on need for students to TA undergrad courses in their subject. As well, with respect to funding, many projects involve field components, and they can add significant additional costs that need to be covered.

Benefits

More high quality students, with good funding, means more high quality research in important ARR areas. Will help get recognition from our universities that it is our grad programs (and post grads) and that education that is the strength of our area. More high quality students with scholarships also will grow that support, and show excellence of our area to funding agencies.

Audience

Good students with strong numeracy skills. Universities administrations. Funding agencies.

Challenges

Can we provide positions for more graduates in ARR. Maybe are numbers, if small, are sustainable?

Solutions

Proper advertisement of the work done in our area, its importance, and why good students would want to work in our area. More linkages between universities through technology to offer courses to students beyond their own institution. Additional short courses, or programs to help provide them the needed breadth, especially in 'soft skill' areas. Technology to allow a webcast seminar series, so a speaker in one place is presenting to those in multiple locations.

Even beyond internships, we should discuss the importance of involving researchers from federal labs in the education of grad students. This an excellent relationship, but could be strengthened – in particular, by having higher levels in government recognize the importance of grad students working with federal scientists, and even (possibly) recognizing the need for them to occasionally be involved in teaching,

Issues regarding Canadian citizenship is sometimes a barrier to setting up government internships. Is there a way to work with government to overcome these barriers for short-term internships?

Greater links to organization that support student funding like MITACS. Bring in industry but also find a way to get them to support research linkages between universities and federal government departments.

Bring in groups like Compute Canada to provide training in computing, modern programming languages (e.g. python), big data, etc. Maybe also statistics training is needed by many of our students.

VII. Career opportunities in our field

Issue

We need to do a better job of connecting academia with industry and government at the graduate level to help graduate students identify career paths and network. Opportunities beyond ECCC. Are there other career options (e.g. government policy and analyst) beyond standard research and forecasting type positions.

Problem

Limited number of academic positions and other permanent research positions. Industry opportunities appear to be limited, but are they really?

Benefits

Knowing that there are jobs, especially different types of jobs, will attract quality students, likely from a more diverse pool, to ARR. Knowing what employers, including industry, want from our students may help the quality of their training and this their employability.

Audience

Those wanting to work in ARR, as well as those wanting to hire or work with trained ARR professionals.

Challenges

While degrees should need to be relevant, they should not be strictly vocational.

Solutions

How can we collect this information is the most useful way for students? How does the CMOS LinkedIn job page work? Do people (either students or employers) use it? We want to take advantage of existing resources

Better communication across universities about programs, curriculum, workshops, etc. This is a key barrier to making progress. ARRCU's goal is to overcome some of these communication barriers. The medical physics community in Canada seems to have been successful at improved collaboration rather than competition. Perhaps we can look to them as a guide. Discussion about careers, for example, guest lecturers, graduate committee members, adjuncts from industry and government.

We need to think beyond AR and Ocean to Earth System science. ESMs are getting more and more complex and we need people with skills in hydrology, biochemistry, etc. - not just AR and Ocean.

An industry survey (discussed more in the ARRCU-Industry white paper) carried out by an Industry Advisory Panel at UBC suggested that the traditional math and physics heavy traditional ECCC education track is NOT what most industry wants. The current needs of industry in that survey included air quality (both anthropogenic and forest fire), computing & deep learning, clean-energy jobs, as well as climate change.

There is a great opportunity for students to do summer jobs and gain exposure, get credits in the program. It serves two purposes: companies see expertise available and students see career possibilities.

Gap in weather people on television, they don't have atmospheric background only communication. Environmental science students, think of maths and physics for environmental science? Summer program to teach maths and physics for environmental students

VIII. Post-doctoral training

Issue

Important stage in higher level training. But most post-docs won't end up with academic positions. Thus, what skills and career training do they need? What does this involve beyond typical ARR research.

Problem

For both graduate and postdoctoral education, sustained funding is a requirement. Coherent groups with momentum can fall apart when funding vanishes, as with the non-renewal of CCAR in 2017.

Do post-docs know what career paths are available to them? How do we communicate these opportunities?

Benefits

Post-docs having a better understanding of career paths available to them, and thus better able to focus on the needed skills.

Audience

Post-docs and those mentoring them.

So What

What are the goals of international post-docs? What are their intentions wrt immigration? Are they made aware of immigration issues etc.? What kind of work authorization do they have? Some post-docs can teach, some can't. Is teaching experience important to them? What about "teaching post-docs". These exist in the US - is this an option for Canada? Do we have enough undergraduate-focussed institutions to establish a market for "teaching post-docs"?

Solutions

Sharing information across universities, program structure, who is targeted, coordinate, pull resources, eliminate fragmentation. Look at other communities for a model of how they do this. Talk more to postdocs to see what they want. Maybe form a CMOS post-doc community/group, just like students, but able to focus on their issues and concerns.

IX. Continued education and training after 'school'

Issue

We are always learning, and continued education and training for professionals in ARR will always be of a benefit to them, and may allow for additional career opportunities.

Problem

Not always easy to get access to such courses or short courses, especially for those working full time.

Benefits

Better trained, more qualified and happier ARR professionals.

Audience

Those with degrees in ARR that are working in the field.

Challenges

As professionals, these individuals should have the training and knowledge to improve themselves.

Solutions

Continued education for professionals could be done very well in the online realm. "Certificate" options could be available through online curriculum. This could also be a valuable revenue stream for universities. Another option is to revisit how universities deal with part-time students. There are likely often times that professionals would like to go back to school, but are not able to take a leave from their jobs. Professionals are also lacking resources about potential visiting scientist opportunities that can help to expand their skill set. Professional workshops are also an option. Ways to have side workshops on outside curricula topics, learn how policy function, opening of courses to people that could explore the expertise, Such policy workshops could also inform policy makers about atmospheric research needs and the impacts of policy maker on researcher in Canada.

X. Communication in Education (i.e. past heads and chairs meeting)

Issue

How to keep communication ongoing so that the community keeps discussing these issues.

Problem

Limited time and locations to bring everyone together, combined with the cost to travel to such meetings.

Benefits

Improved coordination and planning in the community

Audience

ARR academics, federal government ARR scientists and university administrators.

Challenges

The field has continued to advance even without such meetings.

Solutions

This would be a natural part of the responsibility of PARRC. Unlike to be any benefit of splitting the educational and research discussions (particularly at the graduate level!). Still, some source of funding will need to be developed.

XI. Communication of our science to the public

Issue

Outreach is important. ARR is important in many ways to the public, yet there is often flawed or incomplete understanding of our science among the general populace.

Problem

How to train people in communication so that our science can be better communicated.

Benefits

A general populace that understands our science will be better informed for their own well-being, but also likely to be more supportive of the work and research being carried out in ARR.

Audience

ARR professionals as well as those who can train them in the needed communication skills. As part of the training, how to we want to involve students and other HQP such as post-docs in this process.

So What

CMOS has a communication specialist. There are others trained in this area. If we continue as at present, won't the information get out anyway?

Solutions

Specialized courses to be offered in this area. Short courses, web courses, events during meetings like the CMOS congress will all be of benefit. Packages such as how to interact with the press could be prepared and distributed.

XII. Summary

Two of the key aspects of ARR are education and training, both at the undergraduate and graduate level, as well as communication and outreach. The White Paper suggested two key recommendations in this area:

- Enhanced coordination between government and academic partners is urgently needed in the areas of education and training. This includes regular meetings to assess and undertake year-to-year planning to improve education and training programs in ARR across Canada. This could also encourage greater collaboration between different academic groups at different universities (e.g., many smaller groups/universities have difficulty running full undergraduate programs).
- We recommend exploring more ways and mechanisms for student and postdoctoral funding to engage in partnership research. The scope could be flexible and include industry, government at all levels, and non-governmental organizations.