

Education and Public Outreach Committee Report – for the CASCA Board at CASCA 2009

Submitted by Joanne Rosvick, Vice-Chair.

This report covers the period from May 2008 to May 2009. The bulk of the committee's activities for this past year have been directed towards IYA 2009.

1. Current Committee Members

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| Chair: | Dennis Crabtree | (2005-10) Gemini Observatory |
| Vice-Chair: | Joanne Rosvick | (2005-11) Thompson Rivers University |
| Members: | Jan Cami | (2008-11) University of Western Ontario |
| | Martin Connors | (2007-10) Athabasca University |
| | Yvan Dutil | (2008-11) |
| | Louise Edwards | (2008-11) Trent University |
| | Ray Jayawardhana* | (2007-10) University of Toronto |
| | Nathalie Martimbeau | (2006-09) Harvard-Smithsonian Center for Astrophysics/Montréal Planetarium |
| | John Percy | (2005-09) University of Toronto |
| | Gordon Sarty | (2008-11) University of Saskatchewan |
| ex-officio: | Robert Lamontagne | Université de Montréal |
| ex-officio: | Paul Hickson | University of British Columbia |
| Board Representative: | James Di Francesco | HIA |
| GSC Representative: | Talayeh Hezareh | University of Western Ontario |
| Education Co-ordinator: | Heather Theijsmeijer | |

The EPO committee met at CASCA 2008 and established the membership listed above.

Nathalie Martimbeau's and John Percy's terms are expiring this year. John Percy is stepping down from the committee; he has the following recommendations for replacements: Ian Short (St. Mary's), Phil Langill (Calgary). In addition, perhaps the committee should try to recruit one or two more senior people in the astronomical community. Nathalie Martimbeau is happy to have her term renewed, and will take over John Percy's role as liaison with Heather.

*Ray Jayawardhana resigned from the committee in the spring of 2009, due to too many other commitments.

2. Report of Activities

a) CASCA 2008 EPO meeting minutes:

There was talk of having strict one-year terms for chairs and vice-chairs. Members are not sure whether that would work for this committee, but it would certainly be a good thing to have more people rotating through these duties, and more opportunities for other members of the committee to participate. Two years minimum might be better. Our graduate student rep can play an important role, especially for IYA. Make sure they are a full member of our committee.

Clearly separate (or organise) the respective duties of this committee and the IYA Canada Committee (Dennis and Jim). We need to give members things to do, especially the new members. Further to this, to generate articles for E-Cass we should, where possible, delegate people to report on specific areas. Nathalie can collect reports on planetariums, for instance (2009 NOTE: she has agreed to do this); Heather should always have an article; the chair should report on any key issues.

We should hold a teleconference at least twice a year. Dave Hanes knows how to set these up.

John Percy has been the liaison with Heather. He will continue to do this for the next while. (2009 NOTE: Nathalie has agreed to pick up this task in September 2009).

Continually work on the cascaeducation.ca website. Nag CASCA members to comment on it. The most important thing is to spread the word to teachers of its availability! Heather should do this. In addition, there is a possibility that the AstronomyCanada.ca website project may be picked up as an industry contribution to our work. The people to look after this are Mike De Robertis and Bill Harris. The CASCA-Westar Lectures should also be promoted. In principle, Heather should do this, but we can and should all help. (2009 NOTE: see Gordon Sarty's contribution in part (f) regarding all of this).

Gordon Sarty has sent a reminder/announcement to Canadian astronomy clubs; he expressed a general interest in liaising with the amateur community, which would be very useful.

Note that the text of Peter Calamai's excellent presentation is on-line in the June 2008 issue of E-Cass

Organize EPO session for CASCA 09 in Toronto! We should be able to get another high-quality plenary speaker. Otherwise, the main thing is to drum up contributions from CASCA members. In particular: we are into a fundraising campaign, and the funds may support IYA or they may support our projects -- such as cascaeducation.ca and AstronomyCanada.ca. The chair needs to monitor this, and keep in touch with Jim Hesser. (2009 NOTE: the Education and Public Outreach session is being held on the first day of CASCA 09).

The chair will have to prepare an EPO Committee report for autumn 2008, and otherwise report to the board (through the First Vice-President). Note too that the chair of the CASCA EPO committee is normally the Canada liaison for IAU Commission 46 (Education and Development). The next duty is to prepare a triennial report, later this year. John Percy is willing to do it, but it's time that someone else took this job. (2009 NOTE: Percy did compile the triennial report).

b) Meetings/communication:

Committee business was conducted via email.

c) Heather Theijsmeijer - CASCA Education Coordinator:

Heather's contract was renewed, and a raise negotiated. She has been busy maintaining the cascaeducation.ca website, doing other outreach tasks, and submitting regular articles for E-Cass (see her report below in part (f)).

d) EPO Fundraising:

Percy and Rosvick compiled a fundraising letter (mentioned in last year's report) and it was sent out to CASCA members this past year. To date only \$10,500 of the anticipated \$30,000 has been raised. It is important to remind CASCA members at CASCA 09 that this is a very worthwhile contribution.

A proposal submitted by CASCA and developed by the IYA Canada Executive Committee was allocated \$24,000 per year over three years by the NSERC PromoScience program. It will allow CASCA to contract a part-time EPO coordinator for a period of 3 years. More details are given below, in Issues, Recommendations and Requests.

As part of IYA 2009, Rosvick has been working with the BC Living Arts Society to promote an IYA event in September. It is hoped that the Society will donate to the CASCA EPO committee the honorarium normally paid to the organiser and host of the event.

e) AstronomyCanada.ca website:

No work has been done by committee members on the website since Percy's 2008 report. The future of the IYA Canada web site created by the CASCA, FAAQ, RASC partnership needs to be examined. Could it possibly be evolved to meet the goals established by the LRP that AstronomyCanada.ca aimed to address? Or, is the LRP's recommendation now so far out of date that the whole idea needs rethinking? In Jim Hesser's report on IYA to the Board allied questions are raised. To succeed, websites need funding or a team of committed volunteers. Funding for someone to manage it would be appropriate since that would ensure the site was kept up to date.

f) Committee members' EPO reports/ IYA 2009 activities:

Jan Cami:

Jan Cami contributed to IYA activities at UWO which included a well-attended opening ceremony with kid's activities, a series of public lectures and simultaneous grad student presentations and sidewalk astronomy events during the 100 hours of astronomy. He volunteered several times for the weekly open house at the Cronyn observatory during the summer and offered interested non-science students in an evening course the opportunity for regular observing with the telescope on campus. He started development of a short role-playing game approach to illustrate the scientific method in an astronomical setting. He supported one of the Canadian students that attended the IYA opening ceremonies in Paris in sharing her experiences. He manned a booth with gas lamps and spectroscopy glasses during several outreach activities. He took part in the Virtual Researcher On Call (VROC) program talking about chemistry in astronomy. He attended meetings organized by the local RASC chapter and collaborated with them on many occasions.

Martin Connors:

Martin Connors and Brian Martin (King's University College) are developing a comprehensive first year astronomy course for on-line delivery. While this is hardly novel in itself there are a number of points that make this course unique:

- 1) It has an overt (and "unabashed") Canadian focus. Canadian astronomy has a long and significant history since the time of the Plaskett telescope and many "firsts" occurred through the efforts of Canadian astronomers. Our students deserve to hear this!
- 2) The course materials form the core of what we intend to become an open-source resource available to all faculty teaching intro astronomy in Canadian universities. We will be inviting interested parties to begin the process of creating an editorial board and authoring team. This could be done under the aegis of CASCA-Education Committee
- 3) The course is scalable from a non-science major to science major course
- 4) The course makes extensive use of interactive applets (most in Flash/ActionScript) and this makes the course particularly suited to active learning approaches.

Although the current course is designed to complement a popular introductory text, the content can be easily modularized and re-purposed to either act as a replacement for a traditional text or to augment existing texts. We intend to present a preview of this course at the CASCA AGM, May 2009.

Ray Jayawardhana:

Ray served as a CASCA Galileo Legacy Lecturer, giving three well-attended talks in Toronto, Halifax and Peterborough, and as a AAS Shapley Lecturer giving lectures in Helena (Montana), Cleveland and to the AAPT Ohio chapter. He also lectured at the IAU astronomy summer school in Mongolia. He did numerous media appearances throughout the year, on CBC and CTV networks, and various CBC Radio programs. He conceived of and implemented the CoolCosmos outreach campaign - an unconventional "in-your-face" initiative to pique people's curiosity about the cosmos they live in. A pivotal piece of CoolCosmos was a four-week campaign, from mid-January, of 3000 ads on the Toronto Transit Commission (TTC). The same five designs also feature in 50,000 bookmarks that are distributed at various outreach events and through libraries and schools. Both the transit ads

and the bookmarks point to the coolCosmos.net web site, which expands on the science behind them through podcasts and graphic-rich articles. French versions of the ads were displayed at 10 Montreal metro stations for four weeks from mid-April, also supported by French articles on CoolCosmos.net. The campaign received media coverage in the Globe & Mail, Toronto Sun, Science, 24 Hours, various blogs and on CBC Metro Morning and Discovery Channel.

Nathalie Martimbeau:

Nathalie participated in an afterschool program at the Massachusetts Institute of Technology's Kavli Institute for Astrophysics as a 'consultant' working with high school students who were developing planetarium shows for the public for science festivals in Cambridge, MA held this spring. She has also participated in the Center for Astrophysics' Science Education Panel, which meets weekly to discuss far-ranging issues both in classroom education and informal science education.

John Percy:

John continued to act as liaison with Heather Theijsmeijer. He also compiled and submitted the triennial report to IAU Commission 46 (Education and Development, see draft report included as point 4 at the end of this document), and posted an invitation to participate in the outreach program Let's Talk Science at <http://www.astro.utoronto.ca/~percy/LTSinvitation.pdf>. He was PI on the PromoScience grant which was awarded to the committee this past year. His IYA 2009 activities include several school-related projects in partnership with the Science Teachers Association of Ontario (STA) and NRC. He is still an active member of the OISE/UT Centre for Science, Math, and Technology Education, the U of T Teaching Academy, and the organizers of Science Rendezvous (www.sciencerendezvous.ca). With a summer student, he is setting up a series of astronomy events in the Toronto Public Libraries, for a variety of audiences.

Joanne Rosvick:

Joanne has been focusing on IYA activities. In addition to providing observatory tours to various school groups and organisations such as Girl Guides and Scouts (astronomy badges) and the versions of those for younger children, she participated in TRU's Open House Astronomy Night on May 2. Other IYA 2009 activities include organising an astronomy-themed summer concert for the Music in the Park series, a student- and faculty-driven astronomy art exhibit for September, and a special night of lectures and observing for the BC Living Arts society to take place in September.

Gordon Sarty:

Gordon has fostered professional-amateur (pro-am) collaboration in the past, and hopes to continue with this under the EPO umbrella. Gordon contacted all well-known Canadian amateur groups and clubs in Canada to promote the Westar lectures and hopes that his connections will be useful for other pro-am ideas. This year a model "Amateur - Professional Collaboration" web page was set up at <http://homepage.usask.ca/~ges125/EdCommittee/exampleProAmpage.html>. We expect the page to go "live" later this year after it has been reviewed by the CASCA Education and Outreach Committee. The model page was constructed following suggestions

from numerous amateur-professional organizations, listed on the web page, and active amateur astronomers.

Heather Theijsmeyer – CASCA Education Coordinator:

Heather's work with the CASCAed website continues as an ongoing project, with new pages being added ("A moment with...", native astronomy, sidewalk astronomy, new articles and new teacher materials) as well as older pages being maintained by updating information and fixing "dead links." Future projects on the site include updating the curriculum resources, as high school astronomy curriculum is changing slightly within the year, as well as a possible image gallery based on Canadian contributions to the field.

In addition to the above, she is working with a planetarium to make the Canadian Junior Astronomer Program (currently on the CASCAed website) more widely advertised and more accessible to students, particularly those taking class trips to the planetarium. This will result in a ready-made package which can be distributed to students through cooperating planetaria, complementing the material on the CASCAed site.

In terms of "outreach," she continues to present astronomy education talks at the Science Teachers' Association of Ontario (STAO) conferences (November 2008 and upcoming in November 2009), as well as at teachers' workshops and informal gatherings such as star parties (Stargazing Manitoulin 2008 and upcoming summer 2009). Evaluation statistics for the STAO 2008 talk "Astronomy Basics: Mastering the ESS Curriculum in Grades 6 and 9" are as follows: Usefulness of Content: 3.85/4 (96%), Effectiveness of Speaker: 3.92/4 (98%) and Overall Session: 3.81/4 (95%). Comments written on feedback forms were very favourable, stating that Heather's session was the best one offered, and that it should be a double session.

As for the "inreach" portion of her job, she will be contributing a talk to the CASCA 2009 Education session, and her articles continue to appear in each issue of E-Cass. She also occasionally contributes to the Education Notes section in E-Cass.

Additional activities with which she has been involved (and on which she continues to work), include completing grant applications to purchase astronomy materials for schools, participating in sidewalk astronomy sessions (summer 2009), participating in media interviews, liaising with Science North for IYA activities and contributing to the teachers' section of the RASC's Observer's handbook.

3. Issues, Recommendations, Requests

- a) Fundraising: CASCA acting for the IYA partnership received a grant from the NSERC PromoScience program. A position was advertised for a 0.15 – 0.2 x full time EPO coordinator to maintain and analyse EPO and IYA activities and contacts for the next 3 years and work towards achieving the desired legacies (e.g., an Astronomy Kit, on-going programs with Canadian Aboriginal educators, increased astronomy programming in Canadian parks, etc.). We are delighted with this, but feel that funds allowing for just one more day of employment per week would enable the coordinator to do much more: the list of tasks

outlined in the job advertisement is extensive and we feel that the coordinator would be much more successful at accomplishing them if they were offered more resources. To this end, we request additional funding from CASCA to enable us to top up the successful candidate's salary.

- b) The IYA 2009 Legacy: A lot of individuals and organisations have worked very hard to establish connections between amateur and professional astronomers, and between the astronomical community, the media, the general public, and so forth. Once IYA 2009 is over, it is important to keep these connections, even beyond the 3 year work term of the PromoScience EPO Coordinator. The EPO Committee of CASCA is the logical choice for taking on this task. We propose that the EPO Committee pick up the legacy of IYA 2009, and to that end we request that the Board considers designating a liaison person (a chair or vice-chair from one of the other CASCA committees, for example) to serve as an ex-officio member of the EPO Committee. Representatives from the RASC and FAAQ should be asked to be ex-officio members of the CASCA EPO Committee as well. Percy suggests that the IYA Executive Committee could become a formal inter-society committee after IYA 2009 is over.
- c) Membership issues: In addition to the post-IYA 2009 membership, the EPO committee needs to discuss (either at a meeting at CASCA 09 or in a teleconference early this summer) whether Heather's position should be integrated with that of the PromoScience coordinator. John Percy's feeling is that there is some advantage to having two people's expertise, but the question should be discussed.
- 4. John Percy's triennial report to IAU Commission 46: Please note that this is only a draft; the final EPO report to be posted on the CASCA website will contain Percy's final report.

Astronomy Education and Outreach in Canada -- 2006.0 to 2009.2

John R. Percy, University of Toronto, Acting Chair: CASCA Education and Outreach Committee

Overview

This report is relatively brief because, as an International Year of Astronomy (IYA) project, we prepared a 16-page booklet "Astronomy for All Canadians: New Initiatives in Canadian Astronomy Education and Outreach", which is available on-line (1). Since then, our main activities have been in connection with IYA; they are described below, and on our website, especially in the monthly Newsletters (2). The IYA Canada Committee consists of leaders in education and public outreach (EPO) representing professional and amateur astronomy, universities and government, business, science centres and astronomy communicators, and Canada's Aboriginal communities. The three core partners are: the Canadian Astronomical Society (CASCA: professional astronomers and graduate students), la Federation des Astronomes Amateurs du Quebec (FAAQ) and the Royal Astronomical Society of Canada (RASC), the last two being composed mainly of amateur astronomers. This three-way partnership, involving hundreds of volunteers across the country, has been the

key to much of our success in IYA. Unfortunately there are very few funding sources available in Canada for science EPO. One is the PromoScience program of the Natural Sciences and Engineering Research Council of Canada. CASCA, the RASC, and some local institutions have obtained support from that source, and the three IYA partner organizations have received a substantial grant from PromoScience to support IYA activities. Another generous donation has come from the Trottier Family Foundation, with additional support from the University of Calgary. And CASCA, FAAQ, RASC, National Research Council (NRC), Canadian Space Agency (CSA), universities, and other organizations and clubs, and their members have given much in-kind support.

CASCA maintains an EPO website (3), and it, and the websites of the FAAQ (www.faaq.org) and RASC (www.rasc.ca), provide information relevant to these organizations' EPO projects, as well as links to other EPO websites and resources such as those of the CSA and NRC.

Elementary and Secondary School

Astronomy is typically taught in grades 1 (age 6), 6 (age 11), 9 (age 14) and 12 (age 17), though the curriculum differs somewhat from province to province. Few teachers, especially at the elementary level, have any background in astronomy, or astronomy teaching. CASCA's education website (3) is designed for grade 6 and 9 teachers. Skyways, an excellent guide for teachers, was written by Mary Lou Whitehorne, published by the RASC, and professionally translated into French (and updated in the process) in late 2005, with support from PromoScience. FAAQ members contribute to that organization's school programs (described on its website), as well as to programs such as "Les Innovateurs a l'Ecole et a la Bibliotheque". Many individual professional and amateur astronomers work closely with teachers in their province or community, providing workshops and other resources -- some of them in partnership with organizations such as Let's Talk Science (www.letstalkscience.ca). NRC has several programs and resources which support the teaching of astronomy across the country.

Ontario's secondary school science curriculum has been revised for 2009, with enhanced emphasis on science skills, societal applications, and environmental education. It includes a substantial revised astronomy/space unit in grade 9 (4), and an excellent grade 12 Earth and Space Science (SES4U) course (5). Because of the importance of supporting school astronomy education, many IYA activities and projects are intended for this purpose. As an IYA project, in partnership with the Science Teachers Association of Ontario (STAO) and the NRC, the astronomical community is developing a teacher resource to support the teaching of astronomy in grade 9. Another IYA project is the development of an astronomy "kit" which will likely be targeted to grade 6. It will include such materials as the IYA GalileoScope.

Undergraduate and Graduate Education

The CASCA education website includes a list of universities that offer programs in astronomy (6), though almost every university, and many colleges -- including most of the

CEGEP colleges in Quebec – offer introductory astronomy courses, primarily for non-science students. CASCA has a strong Graduate Student Committee, which organizes an annual one-day workshop on topics of interest and importance to graduate students. Astronomy graduate students are also heavily involved in EPO.

Education Conferences

There have been no specific conferences dealing with astronomy education and outreach, but papers on these topics are regularly presented at the conferences of CASCA, FAAQ, and RASC. Astronomy educators also present at teachers' conferences, such as those of STAO. Articles on astronomy EPO regularly appear in publications and/or websites of CASCA, FAAQ, and RASC. In 2008, the Ontario Science Centre hosted an international conference of the Association of Science-Technology Centers (ASTC), coincident with the opening of its exhibit "Facing Mars".

Observatories and Planetaria

There are major planetaria in Vancouver, Calgary, Edmonton, Winnipeg, and Montreal, in addition to several smaller facilities across the country. There are also science centres with substantial astronomy exhibits and programs; the Ontario Science Centre in Toronto is Canada's most popular cultural facility, and the National Museum of Science and Technology, in Ottawa, has extensive astronomy programs. Supported by Heritage Canada, the five major planetaria have collaborated in producing shows on Origins, on Astrobiology and, for IYA, a multimedia production called "Galileo Live!". The NRC Herzberg Institute of Astrophysics continues to maintain visitor centres and education programs at its Dominion Astrophysical Observatory in Victoria BC and Dominion Radio Astrophysical Observatory in Penticton BC. Astrolab du Mont Megantic is a major public science facility in Quebec. The David Dunlap Observatory, University of Toronto, closed in 2008; it had maintained an active education program for many decades; a new Dunlap Institute of Astronomy and Astrophysics at the University of Toronto already has a strong EPO program.

The Tatla Lake Online Observatory (7) is one of the few facilities that can be remotely accessed by students across the country -- and beyond.

Amateur Astronomy

The RASC has 29 Centres across the country, and over 4500 members. The FAAQ has 46 clubs and over 1600 members. Both organizations, and many unaffiliated clubs have strong EPO programs; they plan to present over 2500 public and school programs during IYA 2009. They also organize "star parties", both in cities for their members and for the public, and in more remote locations; the largest of these is StarFest in Ontario. The 2009 conference of the RASC will be held in conjunction with the Saskatchewan Summer Star Party. Many Canadian amateurs contribute to research in fields such as variable star observing, asteroid and comet discovery and observation. Canadian amateur astronomers have also been leaders in light pollution abatement, and in establishing dark-sky preserves, most recently in Alberta and Saskatchewan. RASC Vice-President Mary Lou Whitehorne was 2005 recipient of the

Astronomical Society of the Pacific's Las Cumbres Award for outstanding EPO by an amateur astronomer.

Public Education and Outreach

Almost every university astronomy group has programs for the public, including lectures and observatory tours. At the University of Winnipeg, for example, this has included school visits (including First-Nations schools), presentations at school science symposia, presentations about astronomy careers, "open house" at the University and other on-campus programs, programs for home-schooled students, and presentations at the Manitoba Children's Museum. CASCA has continued its CASCA-Westar Visiting Lecture Program, which sends experienced astronomer-educators to smaller centres which do not have local astronomy resources. Two visits were to First-Nations (aboriginal) communities.

The RASC has an extensive and varied program of public education which reaches over 100,000 Canadians annually, through a wide variety of programs, many of them in partnership with other local organizations. The RASC was the 2003 winner of NSERC's Michael Smith Award for excellence in science outreach. The FAAQ's public education programs are equally extensive and, during IYA, include special "Galileo Lectures", and travelling exhibits about the history of astronomy.

Astronomy continues to be well-represented in the Canadian news media, thanks to journalists such as Terence Dickinson, Dan Falk, Jay Ingram, Bob McDonald (a member of the IYA Canada Committee), and Ivan Semeniuk.

International Year of Astronomy

As in most other countries, the largest single undertaking in astronomy EPO has been the planning for IYA. As mentioned, that has been done in Canada by a broad-based committee from "the astronomical community". Our vision is "to offer an engaging astronomy experience (a "Galileo moment") to every person in Canada, and to cultivate partnerships that sustain public interest in astronomy". Additionally, we encourage every amateur and professional astronomer to create or join an IYA activity that reflects their personal interests and expertise. More information can be found on our website <http://www.astronomy2009.ca>.

Among the notable projects are:

- Circulating stamps to be issued in April 2009.
- A national "Galileo's Legacy" lecture series.
- Astronomy-themed arts programs by groups such as Toronto's Tafelmusik Baroque Orchestra, and the Toronto and Victoria Symphony Orchestras.
- A curated collection of the very best astronomy images taken by amateur and professional astronomers in Canada.

- Astronomy "trading cards", planispheres, posters, and a book "Mary Lou's First Telescope" produced under the leadership of the RASC.
- Special EPO projects and resources produced with and for Canada's Aboriginal communities.

- An astronomy writing competition for school and university students.

- A legacy of dark sky sites across the country, in cooperation with parks, and with Aboriginal communities.

- In Toronto, engaging astronomy posters were placed in hundreds of buses and subway cars in the public transit system.

- Over 2500 school and public lectures and star parties, displays, and other events across the country.

References

- (1) <http://www.astro.utoronto.ca/~percy/finalastrodoc.pdf>
- (2) <http://www.astronomy2009.ca>
- (3) <http://www.cascaeducation.ca>
- (4) http://www.edu.gov.on.ca/eng/curriculum/secondary/science910_2008.pdf
- (5) http://www.edu.gov.on.ca/eng/curriculum/secondary/2009science11_12.pdf
- (6) http://www.cascaeducation.ca/files/teachers_postres.html
- (7) <http://www.chilcotin.bc.ca/observatory/>