

Leveraging Amateur Astronomers and Social Media in Support of C/ISON Observational Campaign. P. A. Yanamanadra-Fisher¹ ¹Space Science Institute; 3750 Walnut Street, Suite 205, Boulder, CO; padma@spacescience.org .

Introduction: The concept of Citizen Science, of allowing the public to perform simple visual examination of vast data sets according to a set of guidelines, is now becoming multi-dimensional, corresponding to the experience level of participants in the project. Unlike Citizen Science, these interactive and collaborative activities are the equivalent of Inverse Citizen Science, with the scientific community relying on the amateur astronomer community and its data to develop research strategy for observations and an outreach bridge to the public.

Background: The vast data collections of the amateur astronomers spanning many years are untapped for the wealth of information. The interactions of amateur astronomers with professional astronomers have changed significantly in the digital era, from an occasional interaction of exchanging individual images to a sustained collaboration to coordinated global networks of amateur astronomers. Today, amateur astronomers, with sophisticated equipment and software, provide several valuable resources to the professional observers/astronomers: a large source of manpower, or extension of the professional astronomer's group; a vast collection of data that provides both legacy and temporal information and finally, as ambassadors of science, help build bridges between the scientific and public communities. From the professional astronomer/scientist's perspective, given the vast amounts of data acquired through various projects, the natural progression to interactive collaborations between these two communities is tremendously beneficial. I will highlight a current project that leverages the collaboration between professional and amateur astronomers; and the use of social media to include various components of the public: Comet ISON Observing Campaign (CIOC). From the initial discovery of comet C/2012 S1 (ISON) by Russian amateur astronomers in September 2012, to the present day, amateur astronomers provide valuable resources of global coverage, data, and legacy knowledge to the professional community. The Comet ISON Observing Campaign (CIOC) goals (<http://www.isoncampaign.org>) are: (i) a detailed characterization of a subset of comets (sun grazers) that are usually difficult to identify and study in the few hours before their demise; and (ii) facilitate collaborations between various investigators for the best science possible. One of the tangible products is the creation of CIOC_ISON, a professional – amateur astronomer collaboration network established on Facebook, with members from the scientific, amateur, science outreach/education, public from around the globe

(<https://www.facebook.com/groups/cioc.ison>) and a Pinterest presence (<http://pinterest.com/padmayf/comet-ison/>). Members, by invitation or request, provide the details of their equipment, location and observations and post their observations to both share and provide a forum for interactive discussions. Guidelines for observations and their logs are provided and updated as deemed necessary by the scientists for useful data. The long lead time between initial discovery of C/ISON in September 2012 and its perihelion in November 2013 provides a rare opportunity for the scientific and amateur astronomer communities to study a sungrazer comet on its initial (and possibly) only passage through the inner solar system. Many of the amateur astronomers are knowledgeable observers that provide a near-continuous, rapid-response global observing network. This approach has proven to be successful for ground-based observations of Jupiter, Saturn and recently C/Hartley2. These collaborations, once an occasional connection, are now becoming essential and necessary, changing the paradigm of research.

Results: Several interesting results emerged from this campaign:

- (1) the establishment of a network of astronomers (professional, amateur, modelers, media and bloggers) that can be galvanized into action on short notice to support observational campaigns organized by professional astronomers;
- (2) assist in various science investigations pertinent to the campaign;
- (3) provide an alert-sounding mechanism should the need arise;
- (4) immediate outreach and dissemination of results via our media/blogger members;
- (5) provide a forum for discussions between the imagers and modelers to help strategize the observing campaign for maximum benefit.

I will present these results in detail and highlight the direction of the amateur astronomer network with respect to future campaigns and the inclusion of more aspects of social media to enhance the interaction.