2015 ASTRONOMICAL DATA ANALYSIS SYSTEMS

AND SOFTWARE CONFERENCE

25th – 29th October 2015

Rydges World Square, Pitt Street, Sydney, NSW, Australia

BoF AND TUTORIAL ABSTRACT BOOKLET

BoF ABSTRACTS

BoF1: Andre Schaaff
CDS, Observatoire de Strasbourg, CNRS, UDS

Affordable Immersive Visualization of Astronomical Data
Authors: Andre Schaaff (CDS, Observatoire de Strasbourg, CNRS, UDS), Kai Polsterer (HITS gGmbH)

Visualizing data was always an important step to explore complex data sets. Since data is stored in catalogs, scientists developed tools to understand correlations, distributions, relations, etc. in the data. Diagnostic diagrams (e.g. the HR-diagram) still play an important role in astronomy and help to understand physical properties. In many cases, high-dimensional data is projected to a two dimensional plane in order to be inspected. Simulation data is often visualized through a movie giving a 3D rendering but without interaction. In the past, very expensive visualization projects developed dedicated tools, like high resolution hyper-walls at super-computing centers for inspecting large data-sets as well as projected stereoscopic data cubes or heavy headset solutions for three dimensional data experiences.

In recent years, developments like the OculusRift or Google cardboard made immersive three dimensional visualization affordable for everyone. In this BoF we would like to discuss with you these possibilities. We will present low cost visualization projects carried out at CDS and HITS. Public outreach as well as student training are other aspects we would like to discuss. Is it worth developing new tools, or is it just geeky and a simple screen is still the best? Share your opinion with us. Perhaps we could get you involved in developing or at least interested in using new tools.

BoF2: Sarah Brough
AAO

LSST and Australia
co-Authors: Orsola de Marco, Macquarie University; Kate Gunn CAASTRO

LSST is the next generation optical imaging survey. However, in order to undertake the ground-breaking science LSST is capable of, astronomers will need to learn and develop new tools for data mining and manipulation. Australia (through CAASTRO) has recently signed an MOU for 10 Australian astronomers to join the LSST consortium. The objective of this session is to bring together Australian astronomers who are interested in LSST and members of the international LSST community attending ADASS in order to exchange information about LSST data, initiate communication with LSST scientists and to build understanding of the LSST data capabilities as well as challenges within the Australian community.

The content will be short talks on their LSST interests from the Australians who have been given access to LSST through the CAASTRO MOU as well as from international LSST experts attending ADASS. We intend to group these by science area and have time for discussion after each science topic to encourage engagement.

BoF3: Keith Shortridge
Australian Astronomical Observatory

Future Astronomical Data Formats: Evolution and/or Revolution

After the success of last year's data format BoF, we pledged to meet again in Sydney to compare notes and figure out where we're actually going and how fast.

Work continues toward improved standard formats for astronomical data.

We'll gather in Sydney to discuss progress since 2014. There has been a lot of discussion in the FITS community on several keyword proposals, and we hope to hear about implementations of WCS Paper IV time standards in commonly used libraries (Evolution), and we'll hear of the design of new or application to astronomy of other data formats (Revolution).

BoF4: Alice Allen
Astrophysics Source Code Library

Improving Software Citation and Credit
Organizers: Peter Teuben, Astronomy Department, University of Maryland (moderator); Alice Allen, Astrophysics Source Code Library; Bruce Berriman, Infrared Processing and Analysis Center, California Institute of Technology; Kimberly DuPrie, Space Telescope Science Institute; Jessica Mink, Harvard-Smithsonian Center for Astrophysics; Keith Shortridge, Australian Astronomical Observatory

The past year has seen movement on several fronts for improving software citation, including the Center for Open Science's Transparency and Openness Promotion (TOP) Guidelines, the Software Publishing Special Interest Group that was started at January's AAS meeting in Seattle at the request of that organization's Working Group on Astronomical Software, a Sloan-sponsored meeting at GitHub in San Francisco to begin work on a cohesive research software citation-enabling platform, the work of Force11 to "transform and improve" research communication, and WSSSPE's ongoing efforts that include software publication, citation, credit, and sustainability.

Brief reports on these efforts will be shared at the BoF, after which participants will form smaller workgroups to discuss and develop ideas for improving software citation, which will then be shared with the entire group and the floor opened for discussion. We will use the feedback to help form recommendations for software citation to those publishers represented in the Software Publishing Special Interest Group.

BoF5: Amr Hassan
Swinburne University of Technology

Building the astronomical data archives of the future
Organisers: Amr Hassan (Swinburne University of Technology); Andy Green (Australian Astronomical Observatory); Yeshe Fenner (Astronomy Australia Limited)

The main aim of this Birds of a Feather is to discuss the challenges that face large-scale Astronomical data archiving, dissemination, and collaboration platforms, with a particular focus on the relatively new All-Sky Virtual Observatory (ASVO) project. The ASVO project will provide a federated network data archives hosting datasets from astronomical facilities and research groups in Australia, and link those datasets to the global astronomical data fabric. Large-scale data archives in astronomy have been a mainstay of the field for some time (e.g., SDSS, 2MASS, MAST). We would like to discuss not only what these past experiences have taught us, but what new opportunities there are for future archives, and how the community of astronomical archives can better serve the needs of the data-driven, archive based rather than observatory based research of the future.

Motivation talk: 10-20 minutes intro on the ASVO project and the various nodes making it up. This might include a short review of other existing archives worldwide, if we can find a suitable speaker.
Discussion: 1 minute intro to each question, followed by 5-10 minutes of discussion

Proposed Discussion Topics:

- How to build “user-friendly” access to large-scale Astronomical Datasets?
- What advantages do new big data tools and techniques, such as distributed databases and No-SQL databases offer for astronomical archives?
- What is the best way to support queries that cross traditional data archive and instrument/wavelength boundaries? (e.g. cross-matching between archives and wavelengths)
- How can we build better integration among astronomical data archives worldwide?
- What will a successful astronomical data archive look like in 2020? 2025?
- What options exist for providing “bring code to data” type processing, and how can these be made appealing to astronomers?
- How will archives facing daunting data volumes and make that data available to astronomers in a useful way?
- Is a goal of “zero data loss” achievable in astronomy, and if so how?
- What approaches are there for designing an archive to take raw instrument data and then provide processed data to the user via an automated pipeline?

TUTORIAL ABSTRACT

Ivan Zolotukhin
IRAP

New Tools for X-ray Astrophysics in the Epoch of Data and Software Interoperability

Following recent release of the largest catalog of X-ray sources ever created, built from the XMM-Newton data and nicknamed 3XMM-DR5, the supporting website has been opened. For the first time it provides an intuitive search interface for the database of almost 400,000 X-ray sources and several advanced features for scientific analysis such as XSPEC-style spectral fitting of a vast collection of X-ray spectra right in a web browser. Built-in communication layer allows creation of flexible workflows to conveniently bring images, lightcurves and spectra of sets of X-ray objects together for detailed analysis with no pre-installed software required. The database also has handy connections to other X-ray archives and Virtual Observatory (VO) resources and contains pre-computed cross-matches with common X-ray objects catalogs to facilitate easy comparison of (yet unstudied) objects of user interest with known CV, LMXB, HMXB, ULX, AGN and X-ray active stars. The innovative user interface is designed to make X-ray astronomy easily accessible even for researchers from other disciplines.

The authors of this web application propose a tutorial aimed at highlighting the new research capabilities that are opened in X-ray astronomy by the efficient management of existing public data and also by software tools and archives interoperability. We will present several science use cases addressing important astrophysical problems such as search for elusive intermediate mass black holes, studies of populations of X-ray objects in our Galaxy and beyond – likely with quick-look discoveries to be made online. This tutorial may be interesting for the wide audience of researchers no matter of their background concerned with new efficient research methods, for software engineers willing to get familiar with new stack of technologies for quick look online analysis of complex data in astronomy, and for project managers needed to present source catalogs and other rich data to their project's research community.