Astrophysics Code Sharing?

AAS 221 Splinter Meeting
Wednesday, January 9, 2:00-3:00
Panelists

Peter Teuben, *Astronomy Department, University of Maryland*

Omar Laurino, *Harvard-Smithsonian Center for Astrophysics*

Robert Hanisch, *Space Telescope Science Institute*

Bruce Berriman, *California Institute of Technology*

Alice Allen, *Astrophysics Source Code Library*
ASCL information

- History (V1: 1999; V2: 2010)
- Meetings
  - ADASS XXI (Paris, Nov 2011)
  - AAS 220 (Anchorage, June 2012)
  - Software Practice, e-Science (Chicago, Oct 2012)
  - ADASS XXII (Urbana-Champaign, Nov 2012)
  - AAS 221 (Long Beach, Jan 2013)
- Web
  - ascl.net, ascl.net/wp
  - facebook, google+
  - astrobetter (guest posting)
  - astrocomputing blog
  - white paper
Requirements
(Why should I do that?)

Omar Laurino, SAO
What?! Why?!

Why should code be shared?
1. Reproducibility of Results
2. Software Robustness
3. Software Reusability
4. Transparency

A different question (which I am not addressing) is who should require code to be published: the community? High Impact Factor Journals?
What?! Why?!

Why should code be shared?
   1. Reproducibility of Results
   2. Software Robustness
   3. Software Reusability
   4. Transparency

1. only requires black boxes to be published with papers:
   ○ web services
   ○ catalogs

2. and 3. are addressed by open source licences

4. would only require code to be accessible, no matter the license
Why should code be shared?

Transparency and openness trigger positive-sum (win-win) games!
Astrophysics Source Code Library

Alice Allen, ASCL, Editor
Astrophysics Source Code Library

Free on-line registry for source codes of interest to astronomers and astrophysicists

Founded in 1999

Advisory Committee formed in 2011

Active approach to adding codes

Largest resource for codes in existence
Astrophysics Source Code Library

Indexed by ADS ◆ Citable ◆ http://ascl.net

Guide includes table of contents

Number of topics and pages
321 topics • Page 1 of 4 • 1 2 3 4

Codes are listed in alphabetical order
Changes in the community

Starting to see...

- Coders requesting their code be included
- Papers citing codes explicitly
- ASCL entries showing up on CVs, publication lists, and in Google Scholar
- ASCL listed in code documentation
Source Code and Scholarly Publication

Robert Hanisch
Space Telescope Science Institute
Virtual Astronomical Observatory
Goals of scholarly publication

- Disseminate new results
- Expose and describe data upon which conclusions and interpretations are based
- Expose and describe methods by which analysis was conducted
- Create a corpus of community-vetted works that document progress in research

Research results should be transparent, supported by the data and methods, and reproducible
Astronomical research almost totally relies on computation

- Data calibration and analysis
- Custom post-processing
- Modeling and simulation
- Organization and tabulation of results
- Preparation of publications

*Pipelines, standard analysis packages, and numerous simulation tools are well-documented and publicly available*
Codes should be accessible

Custom processing and modeling codes also need to be accessible in order to meet the goals of scholarly publication

- Some disciplines require code and data sharing as a prerequisite for publication
- Publications that include data (and/or data links) and source codes are cited at higher rates
- Please share your codes!
Code Repositories In Other Disciplines

Bruce Berriman (IPAC, Caltech)
Neuroimaging Informatics Tools and Resources Clearinghouse

http://www.nitrc.org/

- Funded by NIH Blueprint for Neuroscience Research.
- Operational in 2006
  - 520 codes, 517 K visits (235 K unique visitors)
- Download stats per code, ratings, reviews, forum,...
Established standards for reproducibility of results and for publishing code with the paper. 
- Authors submit code, data.
- Dedicated editor evaluates results.
  - Paper tagged as compliant.
- Publishes code and data as supplementary material.

http://biostatistics.oxfordjournals.org/content/10/3/405.full

In current issue, Volume 14 Issue 1 January 2013: 11/14 papers post supplementary material
RunMyCode.org

- Web service that supports running codes associated with a scientific publication.
- Create companion site for code; data and code stored on cloud.
- Funded by a number of international agencies (e.g. Sloan Foundation).
- Launched March 2012.
  - Supports R, MATLAB, C++, Fortran, and Rats.
  - 100+ codes from social sciences, economics
  - 8,760 unique visitors (Nov 2012).
Discussion

Your thoughts...?