The rise of Python and the open-development Revolution in Astronomy

Tom Robitaille (@astrofrog)
Freelance | The Astropy Project
Software Use in Astronomy: an Informal Survey
Momcheva & Tollerud, 2015

67% of Astronomers use Python

https://arxiv.org/abs/1507.03989
this change has been tightly coupled with the rise in
openly developed software
in Astronomy, in particular grassroots projects
Binaries

Examples: Keynote, PowerPoint, etc.
:: Open Source Code

Note: No license does not mean free/open source!
Examples: PGPLOT, any unlicensed code, etc.

:: Closed Binaries
Examples: Keynote, PowerPoint, etc.
Open Source/Free Software
Includes license that gives right to study, change, redistribute
Examples: CASA, IRAF, DS9, etc.

Source Code
Note: No license does not mean free/open source!
Examples: PGPLOT, any unlicensed code, etc.

Binaries
Examples: Keynote, PowerPoint, etc.
Open development
Discussion is done in the open and anyone can join in!
Examples: ENZO, yt, SunPy, Astropy, etc.

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This talk

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Binaries
Examples: Keynote, PowerPoint, etc.
The yt project

yt is an open-source, permissively-licensed python package for analyzing and visualizing volumetric data.

Started in 2007 by Matt Turk

~100 contributors to date

Note: not just a Python package, contains significant sections in C/C++!

http://yt-project.org  @yt_astro
SunPy

The community-developed, free and open-source solar data analysis environment for Python.

Started in 2011 by a group of solar physicists

~60 contributors to date

http://sunpy.org  @SunPyProject
The Astropy Project is a community effort to develop a single core package for Astronomy in Python and foster interoperability between Python astronomy packages.

http://astropy.org

@astropy
Developers/Contributors for the Astropy core package (as of 14th October 2016):

Ryan Abernathey
Shailesh Ahuja
Tom Aldcroft
Anthony Horton
Anne Archibald
Cristian Ardelean
Matteo Bachetti
Kyle Barbary
Geert Barentsen
Pauline Barmby
Paul Barrett
Andreas Baumbach
Chris Beaumont
Daniel Bell
Elijah Bernstein-Cooper
Kristin Berry
Francesco Biscani
Thompson Le Blanc
Christopher Bonnett
Joseph Jon Booker
Médéric Boquien
Azalee Bostroem
Matthew Bourque
Larry Bradley
Gustavo Bragança
Erik M. Bray
Eli Bressert
Hannes Breitzenbach
Hugo Buddelmeijer
Doug Burke
Mihai Cara
Patti Carroll
Mabry Cervin
Pritish Chakraborty
Alex Conley
Jean Connelly
Simon Conseil
Ryan Cooke
Yannick Copin
Matthew Craig
Steven Crawford
Neil Crighton
Robert Cross
Kelle Cruz
Dan P. Cunningham
Daniel Datsev
Matt Davis
Christoph Deil
Nadia Dencheva
Jörg Dietrich
Axel Donath
Michael Droettboom
Zach Edwards
Jonathan Eisenhammer
Thomas Erben
Henry Ferguson
Jonathan Foster
Ryan Fox
Lehman Garrison
Simon Gibbons
Adam Ginsburg
Christoph Gohlke
Danny Goldstein
Perry Greenfield
Dylan Gregersen
Austen Groener
Frédéric Grollier
Karan Grover
Kevin Gullikson
Hans Moritz Günther
Chris Hanley
Alex Hagen
Paul Hirst
Moataz Hisham
Michael Hoenig
Emma Hogan
Derek Homeier
Anthony Horton
JC Hsu
Lingyi Hu
Eric Jeschke
Eric Depagne
Joseph Jon Booker
Sarah Kendrew
Marten van Kerkwijk
Wolfgang Kerzendorf
Lennard Kiehl
Rashid Khan
Aleh Khvalko
David Kirkby
Dominik Klaes
Kacper Kowalik
Roban Hultman Kramer
Arne de Laat
Antony Lee
Daniel Lenz
Simon Liedtke
Pey Lian Lim
Stuart Littlefair
Joseph Long
Joe Lyman
Curtis McCully
Vinayak Mehta
Aaron Meisner
Serge Montagnac
José Sabater Montes
Francesco Montesano
Brett Morris
Michael Mueller
Stuart Mumford
Demetri Muna
Prasanth Nair
Bogdan Nicula
Joe Philip Ninan
Asra Nizami
Bryce Nordgren
Miruna Oprescu
Carl Osterwisch
Luigi Païoro
Asish Panda
Madhura Parikh
Neil Parley
Sergio Pascual
Rohit Patil
David Perez-Suarez
Ray Plante
Orion Poplawski
Adrian Price-Whelan
J. Xavier Prochaska
David Pérez-Suárez
QuanTakeuchi
Tanuj Rastogi
Juan Luis Cano Rodríguez
Evert Rol
Alex Rudy
Joseph Ryan
Eloy Salinas
Gerrit Schellenberger
Michael Seifert
David Shiga
Albert Y. Shih
David Shupe
Jonathan Sick
Leo Singer
Brigitta Sipocz
Shivan Sornarajah
Shantanu Srivastava
Ole Streicher
Matej Stuchlík
Bernardo Sulzbach
James Taylor
Jeff Taylor
Kirill Thernshyov
Victor Terrón
Scott Thomas
James Turner
Miguel de Val-Borro
Jonathan Whitmore
Julien Woillez
Jake VanderPlas
Lisa Walter
Benjamin Alan Weaver
Jonathan Whitmore
Julien Woillez
Víctor Zabalza
Astropy Core Package

6 major public releases (first release February 2013)
Latest stable version: v1.2.1 (released 22\textsuperscript{nd} June 2016)

\(\sim 180\) individual contributors so far!
Over 16,000 commits (as of 17\textsuperscript{th} October 2016)
Core data structures and transformations

- Constants (astropy.constants)
- Units and Quantities (astropy.units)
- N-dimensional datasets (astropy.nddata)
- Data Tables (astropy.table)
- Time and Dates (astropy.time)
- Astronomical Coordinate Systems (astropy.coordinates)
- World Coordinate System (astropy.wcs)
- Models and Fitting (astropy.modeling)
- Analytic Functions (astropy.analytic_functions)

Connecting up: Files and I/O

- Unified file read/write interface
- FITS File handling (astropy.io.fits)
- ASCII Tables (astropy.io.ascii)
- VOTable XML handling (astropy.io.votable)
- Miscellaneous Input/Output (astropy.io.misc)

Astronomy computations and utilities

- Convolution and filtering (astropy.convolution)
- Data Visualization (astropy.visualization)
- Cosmological Calculations (astropy.cosmology)
- Astrostatistics Tools (astropy.stats)
- Virtual Observatory Access (astropy.vo)

http://docs.astropy.org
Astropy-affiliated packages

- **photutils**: An Astropy Package for Photometry
  - Observation planning
  - Image reprojection
  - Publication-quality image plotting
  - Machine learning
  - Photometry

- **γπ**: A Python package for gamma-ray astronomy
  - Interface to many web services/archives
  - Gamma-ray data analysis
  - CCD image reduction
  - Spectroscopic analysis
  - ‘Big’ spectral cube analysis (e.g. ALMA, etc.)
  - Spectral cube slicing

- **snCosmo**: A Python Library for Supernova Cosmology
  - etc.

http://affiliated.astropy.org
[AstroPy] PyAstronomy  Stefan Czesla
  •  [AstroPy] Proliferating py-astro-libs  Marshall Perrin
    ○  [AstroPy] Proliferating py-astro-libs  Wolfgang Kerzendorf
      •  [AstroPy] Proliferating py-astro-libs  Stefan Czesla
      •  [AstroPy] Proliferating py-astro-libs  Erik Tollerud
      •  [AstroPy] Proliferating py-astro-libs  Erik Bray
    ○  [AstroPy] Proliferating py-astro-libs  Taro Sato
      •  [AstroPy] Proliferating py-astro-libs  Thomas Robitaille
    ○  [AstroPy] Proliferating py-astro-libs  Thomas Robitaille
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      •  [AstroPy] Proliferating py-astro-libs  Kelle Cruz
      •  [AstroPy] Proliferating py-astro-libs  Tom Aldcroft
      •  [AstroPy] Proliferating py-astro-libs  Matthew Turk
      •  [AstroPy] Proliferating py-astro-libs  Mubdi Rahman
      •  [AstroPy] Proliferating py-astro-libs  Perry Greenfield
      •  [AstroPy] Proliferating py-astro-libs  Tommy Grav
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      •  [AstroPy] Proliferating py-astro-libs  Victoria G. Laidler
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      •  [AstroPy] Proliferating py-astro-libs  Erik Tollerud
      •  [AstroPy] Proliferating py-astro-libs  Marcel Haas
      •  [AstroPy] Proliferating py-astro-libs  Neil Crighton
      •  [AstroPy] organizing meetings to organize astropy  Marshall Perrin
      •  [AstroPy] Proliferating py-astro-libs  Mark Sienkiewicz
      •  [AstroPy] Proliferating py-astro-libs  Thomas Robitaille
  etc ...
Note: A copy of this page now exists on the [github astropy project wiki](https://github.com/astropy/astropy/wiki). It is recommended that further changes/additions/etc. be made there.

This page lists all developers interested in contributing to various aspects of a potential common astronomy python package.

Add your name to any of the sections. Feel free to suggest new sections!

The sections are not in any order (no indication of priority, and some of these things are probably too advanced to make it into a common package)

**Moderation of the discussions/decisions and coordination of the efforts**

- Erik Tollerud
- Perry Greenfield
- Thomas Robitaille

15th June 2011: We (Erik, Perry, and Thomas) would like to suggest that we try moderating the discussions and coordinating the efforts as a group of three rather than picking a single person. Please take the following poll to let us know whether you would be happy with this. The poll will remain open until Friday 17th at 9pm EST.

18th June 2011: The final poll results were 53 'yes' votes, and 2 'no' votes, so the three of us will form a coordination team

**Overall planning/Big picture stuff**

- Thomas Robitaille
- James Turner (not necessarily speaking for Gemini)
- Tom Aldcroft
In-person meetings are crucial
Open Development in 2016
[PATCH] Clear upper bits during sign extension

- From: Yao Qi <yao at codesourcery dot com>
- To: <gdb-patches at sourceware dot org>
- Date: Mon, 29 Dec 2014 09:12:49 +0800
- Subject: [PATCH] Clear upper bits during sign extension
- Authentication-results: sourceware.org; auth=none

I see the error message "access outside bounds of object referenced via synthetic pointer" in the two fails below of npe gdb testing

```
print d[-2]\"M
access outside bounds of object referenced via synthetic pointer\"M
(gdb) FAIL: gdb.dwarf2/implptrconst.exp: print d[-2]
(gdb) print d[p-1]\"M
access outside bounds of object referenced via synthetic pointer\"M
(gdb) FAIL: gdb.dwarf2/implptrpiece.exp: print d[p-1]
```
in the first test, 'd[-2]' is processed by GDB as '* (d[-2])'. 'd' is a synthetic pointer, so its value is zero, the address of 'd[-2]' is -2. In dwarf2loc::indirect_piece_value,

```c
/* This is an offset requested by GDB, such as value subscripts.
   However, due to how synthetic pointers are implemented, this is
   always presented to us as a pointer type. This means we have to
   sign-extend it manually as appropriate. */
byte_offset = value_as_address (value);
```

```c
if (TYPE_LENGTH (value_type (value)) < sizeof (LONGEST))
  byte_offset = gdb_sign_extend (byte_offset, 8 * TYPE_LENGTH (value_type (value)));
```

```c
byte_offset += piece->v.ptr.offset;
```
on MIPS target, after [1], byte_offset is -2 (0xffffffffffffffff),
because 32-bit -2 (as an address) is sign extended to 64-bit. After
[2], we manually sign extend byte_offset too, and then it becomes
0xfffffffffffffff, which is wrong. Function gdb_sign_extend
sign-extends VALUE on bit BIT, and assumes upper bits from bit BIT
are all zero. That is why the code works well on targets on which address
is zero extended, such as x86. On these targets, byte_offset is
0xffffffff (zero extended from 32-bit address -2).

The patch is to clear upper bits of VALUE in gdb_sign_extend first.
Regression tested on x86-64-64-gnu, and fixes two fails above.

gdb:
2014-12-29 Yao Qi <yao@codesourcery.com>
---
++ util.c (gdb_sign_extend): Clear bits from BIT in VALUE.
---
gdb/util.c | 9 ++++
1 file changed, 9 insertions(+)
diff --git a/gdb/util.c b/gdb/util.c
index 47d9be7..e023963 100644
--- a/gdb/util.c
+++ b/gdb/util.c
@@ -3031,6 +3031,15 @@ gdb_sign_extend (LONGEST value, int bit)
     if (((value >> (bit - 1)) & 1) != 0) {
         LONGEST signbit = ((LONGEST) 1) << (bit - 1);
         LONGEST mask = -1;
         int i;
         +
         /* Generate a mask in which bits [0, BIT - 1] are one. */
         +
         for (i = 0; i < bit; i++)
             mask = mask << 1;
         +
         mask--;
         +
         /* Clear bits from bit BIT. */
         +
         value &= mask;
         +
         value = (value ^ signbit) - signbit;
     };
---
1.9.3
Repository for the Astropy core package [http://www.astropy.org](http://www.astropy.org) — Edit

- **13,977** commits
- **11** branches
- **34** releases
- **142** contributors

<table>
<thead>
<tr>
<th>Branch</th>
<th>Description</th>
<th>Date</th>
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<tbody>
<tr>
<td>master</td>
<td>astropy</td>
<td>Latest commit f9148f0 5 hours ago</td>
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<tr>
<td>astrofrog</td>
<td>Merge pull request #4280 from opolawski/pytest23</td>
<td>a month ago</td>
</tr>
<tr>
<td>cextern</td>
<td>Merge pull request #4045 from mdboom/wcs/precision</td>
<td>26 days ago</td>
</tr>
<tr>
<td>dev</td>
<td>Add tool to fix up parsing tables</td>
<td>3 months ago</td>
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<tr>
<td>docs</td>
<td>Merge pull request #4238 from bsipocz/docs_fixing_typo_VI_II</td>
<td>10 days ago</td>
</tr>
<tr>
<td>licenses</td>
<td>Upgrade PLY to 3.6</td>
<td>3 months ago</td>
</tr>
<tr>
<td>static</td>
<td>Fixed support on Python 3, and got rid of .astropy-root for astropy/a...</td>
<td>11 months ago</td>
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<td>Don't rely on .git to enable auto-build when importing from source tr...</td>
<td>4 months ago</td>
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<tr>
<td>.gitattributes</td>
<td>Use union merge for changelog</td>
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</tr>
<tr>
<td>.gitignore</td>
<td>Ignore .swo files generated by vim</td>
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<tr>
<td>.gitmodules</td>
<td>Update the astropy_helpers URL to the real astropy_helpers.</td>
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</tr>
<tr>
<td>.mailmap</td>
<td>Update .mailmap for impending release</td>
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<tr>
<td>.travis.yml</td>
<td>Adding pytz to .travis.yml</td>
<td>a month ago</td>
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</table>
Fix for issue [3739]  Affects-release  Enhancement  io.fits
#4065 opened on Aug 11 by anizami

Editing modeling docs  Docs  modeling
#4064 opened on Aug 11 by anizami

Handle sorting NaNs and masked values in jsviewer  Affects-release  Bug  table
#4052 opened on Aug 7 by sargas

Some polynomial model refactoring (WIP?)  Affects-release  modeling
#4049 opened on Aug 7 by embary

Update `bounding_box` property and new `Model.render()` method in `astropy.modeling`  Affects-dev  modeling
#4040 opened on Aug 5 by patti  v1.0.0  5 of 5

Add sample plots to built-in models  Docs  modeling
#4008 opened on Jul 25 by sYnfo

Retry --open-files check once after garbage collection  Affects-release  Bug  testing
#4002 opened on Jul 24 by embary

POC: tables within tables within tables!  Affects-dev  table
#3663 opened on Jul 15 by taldcraft
103 Open  2,685 Closed

   #4065 opened on Aug 11 by anizami

2. Editing modeling docs  Docs  modeling
   #4064 opened on Aug 11 by anizami

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7. Retry --open-files check once after garbage collection  Affects-release  Bug  testing
   #4002 opened on Jul 24 by embrai

8. POC: tables within tables within tables!  Affects-dev  table
   #3992 opened on Jul 15 by taldeck
def test_constellations():
    # the actual test for accuracy is in test_funcs - this is just meant
    # to make sure we get sensible answers
    sc = SkyCoord(135*u.deg, 65*u.deg)
    assert sc.get_constellation() == 'Ursa Major'
    assert sc.get_constellation(short_name=True) == 'UMa'

    scs = SkyCoord([135]*2*u.deg, [65]*2*u.deg)
    npt.assert_equal(scs.get_constellation(), ['Ursa Major']*2)
    npt.assert_equal(scs.get_constellation(short_name=True), ['UMa']*2)

    (x 10,000)
## travis-ci.org (Linux and OSX testing)

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<th>Status</th>
<th>Language</th>
<th>Command</th>
<th>Time</th>
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Pull request #4255 - Change ordering of GCRS/ITRS transforms to make more sense

change ordering of GCRS/ITRS transforms to make more sense

18 hours ago by Erik Tollerud

Environment: PYTHON_VERSION=2.6, NUMPY_VERSION=1.9.1

Environment: PYTHON_VERSION=3.4, NUMPY_VERSION=1.9.1
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### All checks have passed

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<td>continuous-integration/appveyor</td>
<td>AppVeyor build succeeded</td>
</tr>
<tr>
<td>continuous-integration/travis-ci/pr</td>
<td>The Travis CI build passed</td>
</tr>
<tr>
<td>coverage/coveralls</td>
<td>Coverage increased (+0.002%) to 76.546%</td>
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This branch is up-to-date with the base branch

Merging can be performed automatically.

**Merge pull request** You can also open this in GitHub Desktop or view command line instructions.

### Some checks were not successful

<table>
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<th>Service</th>
<th>Status</th>
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<td>The Travis CI build could not complete...</td>
</tr>
<tr>
<td>continuous-integration/appveyor</td>
<td>AppVeyor build succeeded</td>
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</table>

This branch is up-to-date with the base branch

Merging can be performed automatically.

**Merge pull request** You can also open this in GitHub Desktop or view command line instructions.
Welcome to the Astropy documentation! Astropy is a community-driven package intended to contain much of the core functionality and some common tools needed for performing astronomy and astrophysics with Python.

User Documentation

What's New in Astropy 1.0?

Astropy at a glance

- Overview
- Installation
- Getting Started with Astropy

Core data structures and transformations

- Constants (astropy.constants)
- Units and Quantities (astropy.units)
- N-dimensional datasets (astropy.nddata)
- Data Tables (astropy.table)
- Time and Dates (astropy.time)
- Astronomical Coordinate Systems (astropy.coordinates)
- World Coordinate System (astropy.wcs)
- Models and Fitting (astropy.modeling)
- Analytic Functions (astropy.analytic_functions)

Connecting up: Files and I/O

- Unified file read/write interface
- FITS File handling (astropy.io.fits)
Challenges for openly developed projects (in no specific order)
Challenge #1: Reaching critical mass
Challenge #2: Keeping the barrier of entry low
Challenge #3:

Heterogeneous development
Challenge #4: Saying NO (to feature creep)
Challenge #5:

Giving credit to contributors
Astropy: A community Python package for astronomy

Astropy Collaboration: Robitaille, Thomas P.; Tollerud, Erik J.; Greenfield, Perry; Droettboom, Michael; Bray, Erik; Aldcroft, Tom; Davis, Matt; Ginsburg, Adam; Price-Whelan, Adrian M.; Kerzendorf, Wolfgang E.; Conley, Alexander; Crichton, Neil; Barbary, Kyle; Muna, Demetri; Ferguson, Henry; Grollier, Frédéric; Parikh, Madhura M.; Nair, Prasanth H.; Unther, Hans M.; Deil, Christoph; Woolley, Julien; Conseil, Simon; Kramer, Roban; Turner, James E. H.; Singer, Leo; Fox, Ryan; Weaver, Benjamin A.; Zabalza, Victor; Edwards, Zachary I.; Azalee Bostroem, K.; Burke, D. J.; Casey, Andrew R.; Crawford, Steven M.; Dencheva, Nadia; Ely, Justin; Jenness, Tim; Labrie, Kathleen; Lim, Pey Lian; Pierfederici, Francesco; Pontzen, Andrew; Ptak, Andy; Refsdal, Brian; Servillat, Mathieu; Streicher, Ole

AB(Max-Planck-Institut für Astronomie, Königstuhl 17, 69117, Heidelberg, Germany robitaille@mpia.de), AC(Department of Astronomy, Yale University, PO Box 208101, New Haven, CT, 06510, USA), AD(Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD, 21218, USA), AE(Space Telescope Science Institute, 7300 San Martin Drive, Baltimore, MD, 21218, USA), AF(Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD, 21218, USA), AG(Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA, 02138, USA), AH(Space Telescope Science Institute, 7300 San Martin Drive, Baltimore, MD, 21218, USA), AI(Center for Astrophysics and Space Astronomy, University of Colorado, Boulder, CO, 80309, USA), AJ(Department of Astronomy, Columbia University, Pupin Hall, 550 W 120th St., New York, NY, 10027, USA), AK(University of Toronto, 50 St George Street, Toronto, ON, M5S3H4, Canada), AL(Center for Astrophysics and Space Astronomy, University of Colorado, Boulder, CO, 80309, USA), AM(Max-Planck-Institut für Astronomie, Königstuhl 17, 69117, Heidelberg, Germany), AN(Argonne National Laboratory, High Energy Physics Division, 9700 South Cass Avenue, Argonne, IL, 60439, USA), AO(Department of Astronomy, Ohio State University, Columbus, OH, 43210, USA), AP(Space Telescope Science Institute, 7300 San Martin Drive, Baltimore, MD, 21218, USA), AQ(Independent developer), AR(S.V. National Institute of Technology, 395007, Surat, India), AS(Independent developer), AT(Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA, 02138, USA), AU(Max-Planck-Institut für Kernphysik, PO Box 103980, 69029, Heidelberg, Germany), AV(European Southern Observatory, Karl-Schwarzschild-Str. 2, 85748, Garching bei München, Germany), AW(Laboratoire d'Astrophysique de Marseille, OAMP, Université Aix-Marseille et CNRS, 13388, Marseille, France), AX(ETH Zürich, Institute for Astronomy, Wolfgang-Pauli-Strasse 27, Building HIT, Floor J, 8093, Zurich, Switzerland), AX(Gemini Observatory, Casilla 603, La Serena, Chile), AZ(UCO Laboratory, California Institute of Technology, 1200 E
Challenge #6:
Improving diversity
Challenge #7: Building good governance models
SEP-0002 - SunPy Organization Definition

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Abstract

The SunPy organization currently lacks a formal organization structure. This proposal defines the SunPy organization which manages the code and related properties (e.g. docs, website, etc.)

Detailed Description

The organization of SunPy is modeled on that usually adopted by non-profit organizations (e.g. 501c. This organization structure is tried and tested and has the added advantage that it should provide a smooth transition to incorporating a SunPy foundation if it becomes necessary in the future (e.g. for funding purposes). The primary role of the organization is to facilitate and promote the use and development of a community-led, free and open-source solar data-analysis software based on the scientific Python environment. This includes but is not limited to the following tasks

- developing the SunPy software library
- manage and protect the SunPy brand and identity
- promote SunPy to the community
- managing SunPy assets, i.e. github account, domain name etc.

The organization consists of an executive director, a board, and the developer community. The goal of the proposed structure to provide and promote community input into the project.
<table>
<thead>
<tr>
<th>Role</th>
<th>Sub-role</th>
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<tr>
<td>Coordination committee member</td>
<td></td>
<td>Tom Aldcroft</td>
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<td>Erik Tollerud</td>
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<td>Astropy.org web page maintainer</td>
<td></td>
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<td>Erik Tollerud, Brigitta Sipocz, Erik Bray</td>
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<td>Core package release coordinator</td>
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<td><strong>Tom Robitaille</strong>²</td>
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<td>astropy.convolution</td>
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Astropy Community Code of Conduct

The community of participants in open source Astronomy projects is made up of members from around the globe with a diverse set of skills, personalities, and experiences. It is through these differences that our community experiences success and continued growth. We expect everyone in our community to follow these guidelines when interacting with others both inside and outside of our community. Our goal is to keep ours a positive, inclusive, successful, and growing community.

As members of the community,

- We pledge to treat all people with respect and provide a harassment- and bullying-free environment, regardless of sex, sexual orientation and/or gender identity, disability, physical appearance, body size, race, nationality, ethnicity, and religion. In particular, sexual language and imagery, sexist, racist, or otherwise exclusionary jokes are not appropriate.
- We pledge to respect the work of others by recognizing acknowledgment/citation requests of original authors. As authors, we pledge to be explicit about how we want our own work to be cited or acknowledged.
- We pledge to welcome those interested in joining the community, and realize that including people with a variety of opinions and backgrounds will only serve to enrich our community. In particular, discussions relating to pros/cons of various technologies, programming languages, and so on are welcome, but these should be done with respect, taking proactive measure to ensure that all participants are heard and feel confident that they can freely express their opinions.
- We pledge to welcome questions and answer them respectfully, paying particular attention to those new to the community. We pledge to provide respectful criticisms and feedback in forums, especially in discussion threads resulting from code contributions.
- We pledge to be conscientious of the perceptions of the wider community and to respond to criticism respectfully. We will strive to model behaviors that encourage productive debate and disagreement, both within our community and where we are criticized. We will treat those outside our community with the same respect as people within our community.
- We pledge to help the entire community follow the code of conduct, and to not remain silent when we see violations of the code of conduct. We will take action when members of our community violate this code such as contacting confidential@astropy.org (all emails sent to this address will be treated with the strictest confidence) or talking privately with the person.

This code of conduct applies to all community situations online and offline, including mailing lists, forums, social media, conferences, meetings, associated social events, and one-to-one interactions.

Parts of this code of conduct have been adapted from the PSF code of conduct.

The Astropy Community Code of Conduct is licensed under a Creative Commons Attribution 4.0 International License. We encourage other communities related to ours to use or adapt this code as they see fit.
Online communities:

GitHub
Mailing lists (astropy, yt-users, sunpy, etc.)
Facebook (Python users in Astronomy)
Twitter

In-person community events

Dedicated conferences (e.g. #pyastro)
Hack days (Astro Hack Week, AAS Hack Day)
Python in Astronomy 2017
8 - 12 May 2017
Lorentz Center, Leiden

http://openastraonomy.org/pyastro/2017/
Apply Now! (Deadline: 9th December)
BoF B4 today @ 17:30
Thank you to all the users and contributors of open projects!