



International Astrostatistics Association

IAA Newsletter – April 2015

Announcing

COIN

Rafael de Souza has begun a website called COINtoolbox, which is part of GitHub. (<https://github.com>). It is a site from which researchers can work on projects together. The COINtoolbox is itself an IAA Cosmostatistics Initiative (COIN) project begun by Rafael over a year ago. COIN projects may be viewed at: <http://cointoolbox.github.io>

There are already some seven projects being maintained under its scope. These are:

- NB_GC's,
- GRANA (General Regression ANalysis in Astronomy),
- Clustering Stars,
- CosmoPhotoz (Photometric redshift estimator utilizing Generalized Linear Models),
- Cosmo ABC (using the Bayesian ABC methodology for modeling astronomical data) ,
- DACO (Domain Adaptation for Supernova Cosmology), and Open Exoplanet Catalogue.

The aim of each project is to produce meaningful published research, and published astrostatistical software. If you are interested in learning more about the COINtoolbox and of any of the ongoing projects, contact Rafael (rafael.2706@gmail.com). He is a researcher at Eötvös Loránd University in Budapest, Hungary. Also feel free to suggest new projects.

NOTE:

Two papers prepared under the scope of the CosmoPhotoz project were recently approved for publication in the journal, *Astronomy and Computing*. They are part of a series of papers aimed to spread the use of generalized linear models among the astronomical community

de Souza, R. S., E. Cameron, M. Killedar, J. Hilbe, R. Vilalta, U. Maio, V. Bffi, B. Ciardi, J. D. Riggs for the COIN collaboration, "The Overlooked Potential of Generalized Linear Models in Astronomy - I: Binomial Regression", *Astronomy and Computing*, TBA (<http://adsabs.harvard.edu/abs/2014arXiv1409.7696D>)

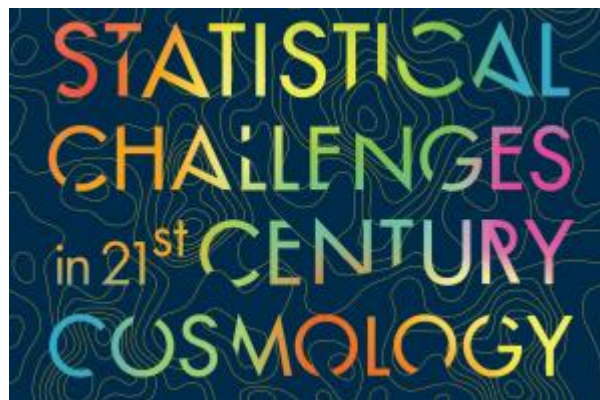
Elliott, J., R.S. de Souza, A. Krone-Martins, E. Cameron, E.E.O. Ishida, J. Hilbe
The overlooked potential of Generalized Linear Models in astronomy- II: gamma regression and photometric redshifts.
(<http://adsabs.harvard.edu/abs/2015A%26C....10...61E>)

COIN software project recently published:

De Souza, R.S. and B. Ciardi, AMADA –Analysis of Multidimensional Astronomical Datasets
(<http://adsabs.harvard.edu/abs/2015arXiv150307736D>)

The software is aimed to facilitate the use of contemporary exploratory and visualization techniques used in a number of other scientific areas. However, these methods have not as yet been fully exploited in astronomical research. The code allows users to visualize subgroups of variables with high association in a hierarchical tree structure through diverse visual tools such as graphs, chord diagrams, dendograms, and heatmaps. .

ANNOUNCING the second edition of...



COSMO21
24-27 May, 2016
Chania, Crete (Greece)
<http://cosmo21.cosmostat.org/>

The emphasis of the conference is on advances and methodological challenges in cosmology, and new results derived from advanced data analysis and modeling methods. Cosmology is entering a new area which will require processing of huge data sets, and measurements at the sub-percent level of accuracy in order to answer fundamental cosmological questions such as the nature of dark matter, dark energy and gravity. As ever, statistics will inevitably play a fundamental role in understanding the new generation of data, but with additional challenges of ever-increasing datasets and large parameter spaces.

Topics

- Cosmic microwave background: non-Gaussianity, component separation methods.
- Weak lensing: galaxy shape measurements, projected mass density map reconstruction, three-dimensional mapping of the dark matter, high order statistics, Euclid, LSST.
- Large-scale structure
- High redshift supernovae.
- Mapping high-z 21-cm radiation
- Lyman-alpha forest
- Astronomical discovery from overwhelmingly large datasets: BOSS, EUCLID, PAU, LAMOST, LOFAR, SKA, LSST and others.
- Statistical methods used in astronomical data analysis (including new developments coming from fertile cross-interactions in astrostatistics). A preliminary list of these methods is included below:
 - Bayesian methods, evidence, model selection.
 - Multivariate classification and clustering.
 - Sparsity: wavelets, compressive sampling, 2D and 3D data representations.
 - Machine learning for large multivariate datasets: Kernel regression, Support Vector Machine, neural networks, supervised learning.

There will be several sessions during the conference. Each session will have at least one keynote speaker, and half of the talks will be contributed talks. The cross-disciplinary nature of the symposium is reflected in the inclusion of speakers from the statistics community in the suggested list.

Conference Registration and Abstract submission opens: 1 January, 2016

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Astrostatistics Books

Published 2 October, 2014

Chattopadhyay, A and T. Chattopadhyay (2014), *Statistical Methods for Astronomical Data Analysis*, Springer Series in Astrostatistics ISBN: 978-1493915064 hardback and ebook formats

Due to be published 14 May, 2015

Andreon, S and B. Weaver (2015), *Bayesian Methods for the Physical Sciences: Learning from Examples in Astronomy and Physics*, Springer Series in Astrostatistics

IN PREPARATION

Hilbe, J.M, R.S. de Souza, and E.E.O. Ishida (2016), *Bayesian Models for Astrophysical Data*, Cambridge University Press

If you are working on an astrostatistics book, or know of someone who is, please let me know and I'll let other IAA members know as well. Contact me at Hilbe@asu.edu

Astrophysics Source Code Library

The [Astrophysics Source Code Library](#) (ASCL) is a free online registry for source codes used in research in, or submitted to, peer-reviewed publications. The ASCL currently has over 1000 code entries and is indexed by the [SAO/NASA Astrophysics Data System](#) (ADS). Its entries are [citable](#) by using the unique ascl ID assigned to each code, and each code entry's can be found by prefacing the number with [ascl.net](#) (i.e., [ascl.net/1201.001](#)).

Additional information will be posted on the forthcoming April ASAIP Blog. Contact Alice Allen for details of the library (alice.allen1@verizon.net)

ASAIP BLOGS

Each month Eric Feigelson and I, as the ASAIP editors, have been posting items of interest to the astrostatistics community on the ASAIP Blog site. We believe that it may be more helpful, and accurate, to let those who manage other websites, or direct other related astrostatistics and astroinformatics activities, to advise you themselves regarding their activities and announcements. Be on the lookout for the April Blogs on ASAIP, which will be published very soon. We hope that it will grow each month. Please check the ASAIP Blog site each month around this time or a bit earlier. Also, send me details of anything you wish to announce to the greater IAA community through the Newsletter – which is sent out to all IAA members.

International Astrostatistics Association

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<through 2015>

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