



International Astrostatistics Association

IAA Newsletter – December 2014

Articles on Astrostatistics



December 2014 issue Significance magazine

88 pages: 28 on astrostatistics

Significance Magazine is a British published magazine-journal for those who are in the statistics and research community. The magazine, which is typically about fifty pages in length, is published five to six times a year and comes with the membership dues of the *American Statistical Association* (ASA) and *Royal Statistical Society* (RSS). The *International Statistical Institute* (ISI) also makes the magazine available to its membership. Given that the ASA and RSS have a combined membership in excess of 30,000, the magazine is read, at least in part, by a relatively large number of people.

The December issue, published on 2 December, is 88 pages, with a special 28 page section on astrostatistics included. The section consists of eleven articles. You may access the articles through the URL:

<http://onlinelibrary.wiley.com/doi/10.1111/sign.2014.11.issue-5/issuetoc>

The cover portrays the subject of the initial article on meteor impacts. Each article comes with one or more nicely developed pictures. Tables and Graphics are also displayed.

ARTICLES (pp 48-76)

Life, the Universe, and Everything, <i>Joseph M Hilbe</i> (Arizona State Univ)	48
Will this century see a devastating meteor strike? <i>Joseph M. Hilbe</i> (Arizona State Univ) & <i>Jamie Riggs</i> (Northwestern Univ)	50
Impact records, <i>Carlo Zapponi</i> (Microsoft-UK)	54
The origin of structure, <i>Benjamin Waldelt</i> (Lagrange Institute, Paris)	56
Making sense of massive unknowns, <i>Rafael de Souza</i> (Eötvös Loránd Univ., Hungary) & <i>Emille Ishida</i> (Max Planck Institute, Garching, Ger)	59
Revealing the invisible, <i>Jessi Cisewski</i> (Carnegie Mellon Univ)	61
How many galaxies in the universe?, <i>Vladimir Surdin</i> (Moscow State Univ, Russia)	64
How do you weight a cluster of galaxies?, <i>Madhura Killedar</i> (Ludwig Maximilians Univ. , Ger)	66
Is the All-There-Is all there is?, <i>Roberto Trotta</i> (Imperial College, London)	69
How fast is our universe expanding, <i>Bruce Bassett</i> (Univ of Cape Town, South Africa) & <i>Yabebal Fantaye</i> (Univ of Rome,Tor Vergata)	72
How will the universe end?, <i>Chris Impey</i> (Univ of Arizona)	73

ARTICLES – IF YOU MISSED IT BEFORE

Symmetry Magazine

Symmetry Magazine, an online publication with a subtitle of “Dimensions of Particle Physics” is a joint publication of Fermilab and SLAC (Stanford Linear Accelerator Center). In its 04 November, 2014 issue, the lead article is titled, “*The Rise of Astrostatistics: Astrophysicists and cosmologists are turning to statisticians to help them analyze an ever-increasing deluge of data*” by Lori Ann White. Three IAA Council members were interviewed for the article: Tom Lored, Jogesh Babu, and Joseph Hilbe. The URL is:

<http://www.symmetrymagazine.org/article/november-2014/the-rise-of-astrostatistics>

The article can be downloaded in PDF form, with a nice header graphic:



Artwork by Sandbox Studio, Chicago with Kimberly Boustead

Quanta Magazine

The 3 November issue of Quanta Magazine has a nicely written article by Natalie Wolchover and Peter Byrne titled, “*In a Multiverse, What are the Odds?*” A correction to the article was made 4 November. The second part of the article, titled “Multiverse Collisions May Leave Traces in the Sky” was published in the 10 November issue, and explored the “efforts to detect colliding bubble universes”. Both articles have had a large number of “reads”. I believe both are interesting, as are the comments that follow each on the Quanta magazine website.

Part 1

<http://www.quantamagazine.org/20141103-in-a-multiverse-what-are-the-odds/>

Part 2

<http://www.quantamagazine.org/20141110-multiverse-collisions-may-dot-the-sky/>

NEW IAA PROJECT GROUP

Name of group: DEep DAta Look (DeDaLo)

Started: 20 November, 2014

Project heads:

Roberto Casalegno, PhD, C&T sas, Turin, IT (project director) roberto.casalegno@b2fh.org
Claudia Travaglio, PhD, INAF, National Institute for AstroPhysics, Turin travaglio@oato.inaf.it
Maurizio Busso, PhD, Dept of Physics, University of Perugia maurizio.busso@fisica.unipg.it

WHAT IS DeDaLo?

Dedalo, from DEep DAta LOok, will be an interactive 3D environment to change and enhance the way scientific Big Data are displayed and therefore analyzed. It will be based on Blender (a Professional 3D Open Source Software) using the internal Blender Game Engine (BGE), a powerful high-level programming tool whose main goal is to provide interactive 3D user experience. Dedalo will embed Python3 scientific tools in Blender, providing all the Scientific Python power in analyzing and handle data.

GOALS:

The project result will be a cross-platform (Windows, GNU/Linux, MacOSX) standalone software package whereby the user will interact with the data in a 'real' 3D environment (not a 2D visualization of a 3D plot), in an extremely intuitive way. In difference from today's commonly used visualization software, Dedalo users will be placed in a 3D environment not only when displaying data, but also when interacting with the underlying Operative System, or with data preprocessing filters. Software pipelines will be substituted with 'rooms', where Dedalo users will store their working context, as files and folders (displayed as real objects), data

processing (as connectors attached to data objects), and finally data visualization, as points or surfaces shown as 3D objects. The user can then manipulate and analyze 3-D data with natural and intuitive actions. Being in a simulated workspace, users will be able to arrange and organize the data itself, as well as the results of their analyses. Moreover, network capabilities will be developed so that users may share the visualization environment with colleagues in real time.

We are also considering development of a persistent World of Data environment, where collaboration can occur asynchronously; i.e., a user may interact with the room of another participant when the owner is offline. Dedalo is planned to be as user-friendly as possible, and will allow users to provide additional Python3 routines as well.

TIME SCHEDULE

Goal: Working Release 1 (alpha), 1 December, 2015

Preliminary software development tests have already commenced. A formal grant proposal will be made when we confirm exactly what resources we need to complete the project, and when they will be available.

PLANNED FEATURES:

- Cross Platform (Windows, GNU/Linux, MacOSX)
- Data Reading/Writing based on Python3 libraries, i.e., nearly every scientific data format.
- Realtime 3D environment, with networking for remote cooperation
- Intuitive interaction with data, files and filters: programming is not needed, but always possible through Python3
- World of Data, a persistent world where working spaces can be shared among collaborators.

DEVELOPMENT SITE:

Announcements regarding Dedalo and communication between project developers will be through an ASAIP website. Dedalo is an IAA/ASAIP co-hosted Project

CONTACT/INFORMATION:

Roberto Casalegno: roberto.casalegno@b2fh.org

The Dedalo Project is hosted under Open Source License (GPLv3) by the B2FH Association, a non-profit association founded in May 2009 (International Year of Astronomy) by Italian Astronomers and Physicists to support and develop Scientific Research in Nuclear Astrophysics.

WORKSHOPS

One Day Workshop on "Astrostatistics" in UK

Title: SuSTaIn EdgeCutter

Date: 17 December, 2014

Sponsor: Royal Statistical Society, London, UK

Organizers: Ofer Lahav, Guy Nason and David van Dyk

Contact: Guy Nason G.P.Nason@bristol.ac.ukn (Tel: +44 (0)117 331 8411)

Workshop URL: <http://www.sustain.bris.ac.uk/ws-astrostatistics/>

Information Email: astrostatistics-workshop@bristol.ac.uk

This workshop will present a selection of cutting edge international research in the rapidly growing discipline of Astrostatistics. The workshop will bring together statisticians who are interested in astronomy and astronomers who are interested in statistical methods. We aim to provide a valuable opportunity to network and to foster extensive future interaction between the two disciplines.

Invited speakers

- Sarah Bridle, University of Manchester, UK
- Alan Heavens, Imperial College, UK
- Jason McEwen, University College, London, UK
- Daniel Mortlock, Imperial College, UK
- Xiao-Li Meng, Harvard University, USA
- Jean-Luc Starck, CEA Saclay, France
- Licia Verde, Universitat de Barcelona, Spain
- Ian Vernon, Durham University, UK

SOUTH AFRICAN WORKSHOP

Title: Cosmology on Safari

Dates: 26-30 January, 2015

Location: Bonamanzi Game Reserve, KwaZulu-Natal, <http://www.bonamanzi.co.za/>

Contact: Kavilan Moodley kavilan.moodley@gmail.com

Registration: <http://www.acru.ukzn.ac.za/~cosmosafari>.

The conference will focus on the interplay between cosmological models and data, with emphasis on the challenges that remain in cosmology. Topics covered will include constraints on primordial perturbations, dark radiation, gravitational waves and inflationary models from the cosmic microwave background, constraints on dark energy, dark matter, and theories of gravity.

Invited speakers include

Markus Boettcher
Dave Romeel
Lyman Page
Rashid Sunyaev

J. Richard Bond
Henk Hoekstra
Joe Silk
Marc-Antoine Miville-Deschenes

Neal Dalal
Jack Hughes
Eva Silverstein

Cosmology on Safari will take place at *Bonamanzi Game Reserve* a private game reserve in the heart of the Zulu kingdom, two hours north of Durban on the east coast of South Africa. Bonamanzi is home to elephants, rhinos, giraffes, zebra, hippos, cape buffalo, leopards, impala, nyala, kudu, crocodiles, wildebeest, and warthogs, along with many other species as well as countless birds. It is also a short 20 minute drive from the world-class Hluhluwe-iMfoloze game reserve which also hosts all the big cats and the endangered African wild dog. The park spearheaded rhino conservation efforts, and is now home to about 10% of the world's rhino population. We will arrange an outing to Hluhluwe-iMfolozi as part of the conference. The weather on the east coast of South Africa is moderated by the Indian Ocean and in January daily highs average 30/86 (C/F) and daily lows average 20/68.

Registration and abstract submission close on December 1, 2014. The registration fee is 4000 ZAR (approximately 360 USD/280 EUR) and covers the conference facility, tea breaks, lunches, bus transportation between the Durban airport and Bonamanzi, a river cruise and conference banquet. Room rates at Bonamanzi are 1200 ZAR pp (single) and 1100 ZAR pp (sharing). This includes dinners and breakfasts. There are also a limited number of dorm-style rooms for students at a reduced rate. There is also some funding to partially support local students - interested parties should contact the conference organizers. While we strongly recommend participants stay at Bonamanzi, there are a number of other lodging options in the vicinity.

From the local organizing committee: H. Cynthia Chiang, Matt Hilton, Kavilan Moodley, Adam Moss, Jonathan Sievers, and Amanda Weltman. Logistical questions can be directed to Vicki Hooper: info@venues.co.za

IAA Cosmostatistics Initiative (COIN)

Led by **Rafael de Souza** <rafael.2706@gmail.com> of the International Research School on Astrophysics, Eötvös Loránd University (Univ of Budapest), COIN is sponsoring various Project Groups, which are formed for the purpose of engaging in the development of software appropriate for cosmological analysis, as well as other more specific research tasks resulting in journal publication. COIN currently has over 70 members in 9 project groups. Project management is being hosted by the **Astronomer's Workbench** <<http://awob.mpg.de>>, a function of the Max Planck Institutes in Germany. Proposals are welcomed for additional Project Groups. The aim is to actually do serious research utilizing the resources of astronomers, statisticians, and information scientists.

ASAIP – PORTAL

Be sure to check out the portal if you have not accessed it for awhile. We have been trying to continually update it, and provide new features. You may find something that will be of interest to your research. <https://asaip.psu.edu>

ISI World Statistics Congress

Rio de Janeiro, Brazil

Jul 27-31 July, 2015

We have made two Special Topics Sessions in Astrostatistics proposals for the 2015 World Statistics Congress. A report on the proposals will be provided in the October Newsletter.

NOTE: We recently received notice that our Special Topics Session on Astrostatistics has been approved.

Organizer/Chair: Joseph M. Hilbe, Arizona State Univ; Jet Propulsion Laboratory, Caltech

PRESENTERS

Radu Stoica,

Probability and Statistics Unit, Laboratory Paul Painlevé, Univ. of Lille 1, France

"Pattern detection and statistical characterization for astronomical data using marked point processes"

Jogesh Babu

Departments of Statistics and Astronomy, Pennsylvania State Univ, USA

"A Primer for Exoplanets: statistical and computational challenges in detecting and confirming exoplanets"

Dalia Chakrabarty

Dept of Mathematics, Univ of Leicester and Dept of Statistics, Univ of Warwick, UK

"How much do galaxies weigh—new Bayesian state space modelling of missing data"

Rafael de Souza

Dept of Astronomy, Eötvös Loránd Univ (Hungary)

"The Fantastic Four: Bridging the gap between Cosmology, machine learning, statistics and biology"

29th IAU General Assembly and

226th Meeting, American Astronomical Society

Honolulu, Hawaii, USA

3-14 August, 2015

The IAU Astrostatistics and Astroinformatics Working Group (IAUAAWG) was awarded a Focus Meeting (FM8) at the triennial 29th IAU General Assembly next August in Honolulu, Hawaii. The title of the meeting is: "Statistics and Exoplanets". It is the first astrostatistics Focus Meeting at the IAU General Assembly. The American Astronomical Society (AAS) Summer Meeting is being held at the same location and dates (1st week) as the IAU GA, making it the largest combined gathering of astronomers in history. Hotel rooms are going to be tight, so don't wait too long. I'll report on this event as we get more information.

IAA Membership Registry on ASAIP

I have now had the IAA Registry of membership information, including research interests, placed on ASAIP. I will no longer send it as an attachment with Newsletters. I plan on updating it at least once every other month. Summary member information will be periodically sent to members as an attachment. It will be in Excel format. Send corrections to Hilbe@asu.edu.

Please send me announcement information for inclusion in future Newsletters.

International Astrostatistics Association

Officers and Council members

<through 2015>

President Joseph M. Hilbe		hilbe@asu.edu ; j.m.hilbe@gmail.com
V. Chair: Jogesh Babu	- statistical sciences	babu@psu.edu
Jean-luc Starck	- astronomical sciences	jstarck@cea.fr
Kirk Borne	- astroinformatics	kborne@gmu.edu
Bruce Bassett	- at-large	bruce.a.bassett@gmail.com

IAA COUNCIL:

Stefano Andreon	ITALY	Univ of Padova	stefano.andreon@brera.inaf.it
Jogesh Babu	USA	Pennsylvania State Univ	babu@psu.edu
Bruce Bassett	S. AFRICA	Univ of Cape Town	bruce.a.bassett@gmail.com
Kirk Borne	USA	George Mason Univ	kborne@gmu.edu
Asis Chattopadhyay	INDIA	Univ of Calcutta	akcstat@caluniv.ac.in
Rafael de Souza	BRAZIL	Eötvös Loránd Univ (Hungary)	rafael.2706@gmail.com
Eric Feigelson	USA	Pennsylvania State Univ	edf@astro.psu.edu
David Hand	UK	Imperial College, London	d.j.hand@imperial.ac.uk
Joseph Hilbe	USA	Arizona State Univ; JPL	hilbe@asu.edu
Martin Kunz	SWITZ	Univ of Geneva	martin.kunz@unige.ch
Tom Lored	USA	Cornell University	Lored@astro.cornell.edu
Oleg Malko	RUSSIA	Moscow State University	malkov@inasan.ru
Vicent Martinez	SPAIN	Univ of Valencia	Vicent.Martinez@uv.es
Jean-luc Starck	FRANCE	French Atomic Energy Comm	jstarck@cea.fr
Roberto Trotta	ITALY	Imperial College, London	r.trotta@imperial.ac.uk
David van Dyk	UK	Imperial College, London	d.van-dyk@imperial.ac.uk
Ben Wandelt	GERMANY	Univ Pierre & Marie Curie	wandelt@iap.fr