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Edited by

Massimo Brescia
S. G. Djorgovski
Eric D. Feigelson
Giuseppe Longo
Stefano Cavuoti

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ASTROINFORMATICS

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In Memory of prof. Klym Ivanovyč Čurjumov,
tragically passed away a few days before the Conference

COVER ILLUSTRATION:

This is a conceptual reproduction of the Naples skyline as seen from Sorrento, location of the IAU Symposium, held in October 2016, together with some artifacts exposing the arising of the Astroinformatics science as virtual bridge between Astrophysics and ICT.

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Chief Editor
PIERO BENVENUTI, IAU General Secretary
IAU-UAI Secretariat
98-bis Blvd Arago
F-75014 Paris
France
iau-general.secretary@iap.fr

Editor
MARIA TERESA LAGO, IAU Assistant General Secretary
Universidade do Porto
Centro de Astrofísica
Rua das Estrelas
4150-762 Porto
Portugal
mtlago@astro.up.pt

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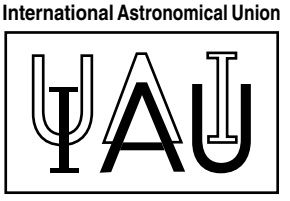

ASTROINFORMATICS

PROCEEDINGS OF THE 325th SYMPOSIUM OF THE INTERNATIONAL ASTRONOMICAL UNION HELD IN SORRENTO, ITALY OCTOBER 19–25, 2016

Edited by

MASSIMO BRESCIA
INAF OACN, Napoli, Italy

S. G. DJORGOVSKI
Dept. of Astronomy, Caltech, USA

ERIC D. FEIGELSON
Dept. of Astronomy and Astrophysics, Penn State Univ., USA

GIUSEPPE LONGO
Dept. of Physics, University Federico II, Italy

and

STEFANO CAVUOTI
Dept. of Physics, University Federico II, Italy

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Preface

As President of Commission on Astroinformatics and Astrostatistics of the International Astronomical Union, I welcome you to the first IAU Symposium on astroinformatics. This is not the first meeting in the field: the 26th meeting on ADASS (Astronomical Data Analysis Software and Systems) was held last weak in Trieste (and members of that group are here today), and this symposium has a strong heritage in workshops held in recent years at Caltech, Seattle, and Sydney. But this is the first time that the broader community of astronomers, through the IAU in collaboration of the giant IEEE organization has recognized this new field of study devoted to the challenges of Big Data and advanced methodology in astronomical research. This is the first time experts from around the world have gathered to share experiences and plan for the future. I have a comment to make. The typical IAU Symposium treats some well-established field of stars or galaxies or cosmology where the leading groups know each other well. But astroinformatics is such a young field, that we do not know each other and we do not know what ideas will emerge from this meeting. So I encourage each of us to have a creative approach to this meeting, work hard to talk to strangers, and help generate a community of scholars who can lead this field into the future.

Eric D. Feigelson
Pennsylvania State University
IAU Commission B3 Astroinformatics and Astrostatistics
December 18, 2016

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Address by the Local Organizing Committee

Dear colleagues,

On behalf of the Local Organizing Committee, it was a real pleasure to host all of you to the Symposium on Astroinformatics of the International Astronomical Union. We hope that, in this new occasion, we did not disappoint you and that the symposium fulfilled your expectations. All our efforts were in this direction. We have counted with very efficient people in the LOC, especially Arianna, who was the true pillar of the organization. Also, we have been very fortunate of having the unconditional help and support of students Civita, Giuseppe, Michele, young collaborators Alfonso, Giuseppe, Stefano and the staff and personnel of the Grand Hotel Vesuvio.

We are deeply grateful to several institutions and corporations for their financial and organizing support: the International Astronomical Union, the Microsoft Corporation, the IEEE Computational Intelligence Society and Astrominer Task Force, the Department of Physics Ettore Pancini of the University Federico II, the Capodimonte Astronomical Observatory of the italian National Institute of Astrophysics, the italian Society of Relativity and Gravitational Physics, the italian National Institute of Nuclear Physics, the Astroinformatics and Astrostatistics Portal.

Thank you very much, and hope to see you again somewhere.

Massimo Brescia, chair LOC
Sorrento, October 24, 2016

Address by the Scientific Organizing Committee

Dear colleagues,

The SOC welcomes you at this IAU Symposium No. 325. We are delighted to see you all here, in Sorrento. This is also the sixth international workshop in the series Astroinformatics which started in 2011 in Pasadena. We gathered here because during the last decade our discipline has experienced a true paradigmatic shift moving from small data sets to the big data regime. Dedicated survey telescopes, both ground based and space borne, are routinely producing on a daily base many tens of terabytes of data of unprecedented quality and complexity. In the near future, new instruments such as LSST and SKA will increase this data stream by several orders of magnitude. Such volumes of data cannot be dealt with traditional tools and each step of the data acquisition chain, from acquisition to processing and interpretation, needs to be tackled with a different mind frame, delegating most of the work to automatic tools exploiting all advances in high performance computing, machine learning and visualization. Astronomy is not the only science which is undergoing such transformation: biosciences, geophysics, remote sensing, environmental sciences, are confronting similar problems and while the underlying methodologies are the same, each field is proposing its own solutions to specific problems and rising new issues which can be profitably used by the other fields. This is why this meeting is attended not only by astronomers.

Over the last decade, astroinformatics has in fact established itself as a new, vibrant field of research placed at the intersection of many different disciplines -mathematics, statistics, computer science. These efforts have led, among the other things, to the establishment of new professional associations such as the International Astrostatistics Association or the Astrominer Task Force under the auspices of the Data Mining Technical Committee of the IEEE Computational Intelligence Society.

This symposium would have not been possible without the contributions of many institutes and bodies. We wish to thank for their sponsorship the Department of Physics Ettore Pancini of the University Federico II in Napoli, the Capodimonte Observatory of the Italian National Institute for Astrophysics (INAF), the Napoli Unit of the Italian National Institute for Nuclear Physics (INFN), the Astrominer Task Force of the IEEE, the Municipality of Sorrento, the Microsoft Research and, last but not least, the International Astronomical Union who has provided numerous grants to allow the participation of many colleagues from other countries. The SOC also wishes to thank the members of the LOC and his chair person Massimo Brescia for having organized such a great meeting.

We wish you all a very constructive and pleasant five working days here.

Giuseppe Longo, Stanislav G. Djorgovski and Eduardo Vera, Co-chairs SOC
Sorrento, October 20, 2016

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and
IEEE - Astrominer Task Force,
ASAIP - Astrostatistics and AstroInformatics Portal,
IMS - Institute for Mathematical Statistics,
are gratefully acknowledged.

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Participants

Walter **Alef**, Max Planck Inst. for Radio Astronomy, Germany walef@mpifr-bonn.mpg.de
Jovan **Aleksić**, Astronomical Obs. of Belgrade, Serbia jaleksic@aob.rs
Rupert **Allison**, Princeton Univ., USA rallison@ast.cam.ac.uk
Valeria **Amaro**, Dept. of Physics - Univ. Federico II, Napoli, Italy amaro@na.infn.it
Ji-Hye **Baek**, Korea Astronomy and Space Science Inst., Korea jhbaek@kasi.re.kr
Aneta **Baloyan**, Byurakan Astrophysical Obs., Armenia aregmick@yahoo.com
Graham **Barnes**, NorthWest Research Associates, USA graham@nwra.com
Jim **Barrett**, Univ. of Birmingham, UK jbarrett@star.sr.bham.ac.uk
Sudhanshu **Barway**, South African Astronomical Obs. (SAAO), South Africa barway@saao.ac.za
Michael **Biehl**, J. Bernoulli Inst., Univ. of Groningen, Netherlands m.biehl@rug.nl
Lucas Axel **Bignone**, IAFE (UBA/CONICET), Argentina lbignone@gmail.com
Sergi **Blanco-Cuaresma**, Obs. of Geneva, Switzerland Sergi.Blanco@unige.ch
David **Borncamp**, Space Telescope Science Inst., Baltimore, Maryland, USA dborncamp@stsci.edu
Olga **Botygina**, Astronomical Obs. of the T. Shevchenko National Univ. of Kyiv, Ukraine botygina86@gmail.com
Matthew **Bourque**, Space Telescope Science Inst., Baltimore, Maryland, USA bourque@stsci.edu
Carlos Henrique **Brandt**, La Sapienza Univ. of Rome, Italy carlos.brandt@icranet.org
Maarten **Breddels**, Univ. of Groningen, The Netherlands breddels@astro.rug.nl
Massimo **Brescia**, INAF - Capodimonte Astronomical Obs., Italy brescia@na.astro.it
Fernando **Caro**, Observatoire de Paris - Lerma, France fernando.caro@obspm.fr
Stefano **Cavuoti**, Dept. of Physics - Univ. Federico II, Napoli, Italy stefano.cavuoti@gmail.com
Kenneth **Chambers**, Inst. for Astronomy Univ. of Hawaii, USA chambers@ifa.hawaii.edu
Seonghwan **Choi**, Korea Astronomy and Space Science Inst., Korea shchoi@kasi.re.kr
Dan **Crichton**, NASA Jet Propulsion Laboratory, USA daniel.j.crichton@jpl.nasa.gov
Cristina **Dalle Ore**, USRA - Lunar and Planetary Inst., USA cristina.m.dalleore@nasa.gov
Pilar **de Teodoro**, European Space Agency, Spain pilar.teodoro@esa.int
Andrie **De Vries**, Microsoft Corporation, USA adevries@microsoft.com
Antonio **D'Isanto**, Heidelberg Inst. for Theoretical Studies - HITS, Germany antonio.disanto@h-its.org
George **Djorgovski**, California Inst. of Technology, Pasadena CA, USA george@astro.caltech.edu
Shep **Doeleman**, MIT Haystack Obs., USA sdoeleman@haystack.mit.edu
Fuqing **Duan**, Beijing Normal Univ., China fqduan@bnu.edu.cn
Pierre **Dubath**, Univ. of Geneva, Switzerland pierre.dubath@unige.ch
Felipe **Elorrieta**, Pontificia Universidad Católica de Chile, Chile fielorrieta@mat.puc.cl
Pablo **Estevez**, Univ. of Chile & Millennium Inst. of Astrophysics, Chile pestevez@cec.uchile.cl
Susana **Eyheramendy**, Pontificia Universidad Catolica de Chile, Chile susana@mat.puc.cl
Elena **Fedorova**, National Taras Shevchenko Univ. of Kiev, Astronomical Obs., Ukraine efedorova@ukr.net
Eric **Feigelson**, Pennsylvania State Univ., USA edf@astro.psu.edu
Qi **Feng**, McGill Univ., Canada qi.feng2@mail.mcgill.ca
Francisco **Forster Burón**, Univ. of Chile, Chile francisco.forster@gmail.com
Emmanuel **Gangler**, LPC - Université Blaise Pascal, France gangler@clermont.in2p3.fr
Mauro **Garofalo**, DIETI, Univ. Federico II, Napoli, Italy mauro.garofalo@gmail.com
Jorge Enrique **Garcia Farieta**, Universidad Nacional de Colombia, Colombia joegarciafa@unal.edu.co
Fabio **Gastaldello**, INAF IASF Milan, Italy gasta@iasf-milano.inaf.it
Panagiotis **Gavras**, IAASARS, National Obs. of Athens, Greece pgavras@noa.gr
Nikos **Gianniotis**, Heidelberg Inst. for Theoretical Studies, Germany nikos.gianniotis@h-its.org
Carlos Alberto **Gomez Gonzalez**, Univ. of Liege, Belgium cgomez@ulg.ac.be
Alyssa **Goodman**, Harvard-Smithsonian CFA, USA agoodman@cfa.harvard.edu
Matthew **Graham**, California Inst. of Technology, Pasadena CA, USA mjg@caltech.edu
Andrew **Green**, Australian Astronomical Obs., Australia andrew.green@aao.gov.au
Steve **Groom**, IPAC, California Inst. of Technology, Pasadena CA, USA sgroom@ipac.caltech.edu
Rustam **Guliyev**, Shamakhy Astrophysical Obs., Azerbaijan rustamdb@gmail.com
Ping **Guo**, Beijing Normal Univ., China pguo@bnu.edu.cn
Hasitieer **Haerken**, Beijing Normal Univ., China hastear@163.com
Yuan **Hailong**, National Astron. Obs., Chinese Acad. of Sciences, China yuanhl@bao.ac.cn
Jeremy **Hare**, The George Washington Univ., USA jeh86@gwu.edu
Sara **Heap**, NASA/Goddard (Emeritus Scientist), USA sara.heap@gmail.com
Nina **Hernitschek**, California Inst. of Technology, Pasadena CA, USA hernitschek@mpia.de
Alisher S. **Hojaev**, Ulugh Beg Astronomical Inst. of Uzbek, Uzbekistan ash@astrin.uz
Maohai **Huang**, National Astron. Obs., Chinese Acad. of Sciences, China mhuang@nao.cas.cn
Pablo **Huijse**, Univ. of Chile, Chile pablo.huijse@gmail.com
Emille **Ishida**, Laboratoire de physique de Clermont emille.ishida@clermont.in2p3.fr
Tomoaky **Ishiyama**, Inst. of Management and Information Technologies, Chiba Univ., Japan ishiyama@chiba-u.jp
Zeljko **Ivezic**, Univ. of Washington, USA ivezic@astro.washington.edu
Colin **Jacobs**, Swinburne Univ. of Technology, Australia colinjacobs@swin.edu.au
Darko **Jevremovic**, Astronomical Obs. Belgrade, Serbia darko@aob.rs
Alin **Kalam**, Vienna Univ., Austria info@alinkalam.eu
Jeffrey **Kern**, National Radio Astronomy Obs., USA jkern@nrao.edu
Sergii **Khlamov**, Kharkiv National Univ. of Radioelectonics, Ukraine sergii.khlamov@gmail.com
Johan **Knapen**, Instituto de Astrofisica de Canarias, Spain jhk@iac.es
Svitlana **Kolomiyets**, Kharkiv National Univ. of Radio Electronics, Ukraine s.kolomiyets@gmail.com
Asmita **Korde-Patel**, NASA/Goddard Space Flight Center, USA asmita.a.korde@nasa.gov
Irina **Kovalenko**, IMCCE/LESIA Paris Obs., France ikovalenko@imcce.fr
Michael **Kurtz**, CFA Harvard, USA kurtz@cfa.harvard.edu
Changhua **Li**, National Astron. Obs., Chinese Acad. of Sciences, China lich@nao.cas.cn
Zhou **Lixiao**, National Astron. Obs., Chinese Acad. of Sciences, China lxzhou@nao.cas.cn
Giuseppe **Longo**, Dept. of Physics - Univ. Federico II, Napoli, Italy longo@na.infn.it
Andrea **Longobardo**, INAF, IAPS, Italy andrea.longobardo@iaps.inaf.it
Colin **Lonsdale**, MIT Haystack Obs., USA cjl@haystack.mit.edu
Stephen **Lubow**, Space Telescope Science Inst., USA lubow@stsci.edu
Vesna **Lukic**, Hamburger Sternwarte, Germany vesna.lukic@hs.uni-hamburg.de
Ashish **Mahabal**, California Inst. of Technology, Pasadena CA, USA aam@astro.caltech.edu
Abhishek **Malali**, Harvard Univ., USA abhishekmalali@g.harvard.edu
Joseph M. **Mazzarella**, California Inst. of Technology, Pasadena CA, USA mazz@ipac.caltech.edu
Erzsébet **Merényi**, Rice Univ., Houston, TX, USA erzsebet@rice.edu
Areg M. **Mickaelian**, Byurakan Astrophysical Obs., Armenia aregmick@yahoo.com
Sergio **Molinari**, INAF, IAPS, Rome, Italy molinari@iaps.inaf.it
Christian **Muller**, Belgian Users Support and Operation Centre, Belgium christian.muller@busoc.be
Fionn **Murtagh**, Univ. of Derby, and Goldsmiths Univ. of London, UK fmurtagh@acm.org
Sara **Nieto Rodriguez**, European Space Agency, Spain sara.nieto@esa.int

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Alfonso **Nocella**, INAF - Capodimonte Astronomical Obs., Italy	nocella@na.astro.it
Ray **Norris**, Australia Telescope National Facility, Australia	raypnorris@gmail.com
Michael **Olberg**, Onsala Space Obs. Chalmers Univ. of Technology, Sweden	michael.olberg@chalmers.se
Wilfredo **Palma**, Pontificia Universidad Catolica de Chile, Chile	wilfredo.palma@gmail.com
Victor **Pankratius**, MIT Haystack, USA	pankrat@mit.edu
Maurizio **Paolillo**, Dept. of Physics - Univ. Federico II, Napoli, Italy	paolillo@na.infn.it
Jongyeob **Park**, Korea Astronomy and Space Science Inst., Korea	parkjy@kasi.re.kr
Reynier **Peletier**, Univ. of Groningen, Netherlands	peletier@astro.rug.nl
Maura **Pilia**, INAF - OA Cagliari, Italy	maura.pilia@gmail.com
Kai **Polsterer**, Heidelberg Inst. for Theoretical Studies, Germany	kai.polsterer@h-its.org
Troy **Porter**, Hansen Experimental Physics Lab., Stanford Univ., USA	tporter@stanford.edu
Pavlos **Protopapas**, Harvard Univ., USA	pavlos@seas.harvard.edu
Nicholas James **Rattenbury**, Univ. of Auckland, New Zeland	n.rattenbury@auckland.ac.nz
Giuseppe **Riccio**, INAF - Capodimonte Astronomical Obs., Italy	riccio@na.astro.it
Luca **Rizzi**, Keck Obs., USA	lrizzi@keck.hawaii.edu
Thomas **Robitaille**, Freelance	thomas.robitaille@gmail.com
Helge **Rottmann**, Max-Planck-Institut für Radioastronomie, Germany	rottmann@mpifr-bonn.mpg.de
Anna **Scaife**, Univ. of Manchester, UK	anna.scaife@manchester.ac.uk
Nicole **Schanche**, Univ. of St Andrews, UK	nicole.thom@gmail.com
Bernard **Schutz**, Cardiff Univ., UK	bernard.schutz@aei.mpg.de
Francesca **Scipioni**, USRA - Lunar and Planetary Inst., USA	scipioni@lpi.usra.edu
Kazuhiro **Sekiguchi**, National Astron. Obs. of Japan, Japan	kaz.sekiguchi@nao.ac.jp
Evgeni **Semkov**, Inst. of Astronomy, Sofia, Bulgaria	esemkov@astro.bas.bg
Brigitta **Sipocz**, Univ. of Hertfordshire, UK	bsipocz@gmail.com
Petr **Skoda**, Astron. Inst. of the Czech Acad. of Sciences, Czech Republic	skoda@sunstel.asu.cas.cz
Yihan **Song**, National Astron. Obs., Chinese Acad. of Sciences, China	yhsong@bao.ac.cn
Peter **Sorensen**, NOT - Nordic Optical Telescope, La Palma, Spain	pms@not.iac.es
Vladimir **Sreckovic**, Inst. of Physics, Belgrade	vlada@ipb.ac.rs
Rachel **Street**, LCOGT, UK	rstreet@lcogt.net
Anton **Strigachev**, Inst. of Astronomy, Sofia, Bulgaria	anton@astro.bas.bg
Maria **Süveges**, Max-Planck-Inst. für Astronomie, Heidelberg, Germany	maria.suveges@unige.ch
Brian **Thorsbro**, Lund Univ., Sweden	brian@thorsbro.dk
Martin **Topinka**, Inst. for Advanced Studies, Dublin, Ireland	martin.topinka@gmail.com
Alessio **Trois**, INAF - OA Cagliari, Italy	atrois@oa-cagliari.inaf.it
Diego **Tuccillo**, GEPI - Observatoire de Paris; MINES Paris Tech, France	diego.tuccillo@obspm.fr
Mattia **Vaccari**, Univ. of Western Cape, South Africa	mattia.vaccari@gmail.com
Edwin A. **Valentijn**, Kapteyn Inst., Univ. of Groningen, Netherlands	valentyn@astro.rug.nl
Thijs J.M. **van der Hulst**, Kapteyn Astron. Inst. Univ. of Groningen, Netherlands	vdhulst@astro.rug.nl
Iryna **Vavilova**, Main Astron. Obs. of the National Acad. of Sciences, Ukraine	irivav@mao.kiev.ua
Civita **Vellucci**, DIETI, Univ. Federico II, Napoli, Italy	civita.vellucci@gmail.com
Dany **Vohl**, Swinburne Univ. of Tech., Australia	dvohl@swin.edu.au
Veljko **Vujcic**, Astronomical Obs. Belgrade, Serbia	veljko@aob.rs
Bingyi **Wang**, Beijing Normal Univ., China	1019525779@qq.com
Mengxin **Wang**, National Astron. Obs., Chinese Acad. of Sciences, China	beawmx@163.com
Yue **Wu**, National Astron. Obs. of Chinese Acad. of Sciences, China	wuyue@bao.ac.cn
Zhang **Yanxia**, National Astron. Obs., Chinese Acad. of Sciences, China	zyx@bao.ac.cn
Yaroslav **Yatskiv**, Main Astronomical Obs. of NASU, Ukraine	yatskiv@mao.kiev.ua
Jiannan **Zhang**, National Astron. Obs.,Chinese Acad. of Sciences, China	jnzhang@bao.ac.cn
Mo **Zhang**, National Astron. Obs.,Chinese Acad. of Sciences, China	mzhang@nao.cas.cn
Olga **Zhelenkova**, SAO RAS, Russia	zhe@sao.ru
Stanislaw **Zola**, Astronomical Obs., Jagiellonian Univ., Poland	szola@oa.uj.edu.pl

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