



Publication Year	2019
Acceptance in OA @INAF	2021-03-10T15:07:55Z
Title	Astronomical Data Analysis Software and Systems XXVI
Authors	MOLINARO, Marco; Shortridge, Keith; PASIAN, Fabio
Handle	http://hdl.handle.net/20.500.12386/30695
Series	ASTRONOMICAL SOCIETY OF THE PACIFIC CONFERENCE SERIES
Number	521

**ASTRONOMICAL DATA ANALYSIS
SOFTWARE AND SYSTEMS XXVI**

COVER ILLUSTRATION:

Hundred millions 2MASS point sources photometry retrieved through HEALPix indexing query through a TAP service (top), and a billion mean isotropic positional errors from GAIA DR1, again using HEALPix indexing retrieval through a TAP service.

Taylor, Mantelet and Demleitner, this volume (page 412).

ASTRONOMICAL SOCIETY OF THE PACIFIC
CONFERENCE SERIES

A SERIES OF BOOKS ON RECENT DEVELOPMENTS IN ASTRONOMY AND ASTROPHYSICS

Volume 521

EDITORIAL STAFF

Managing Editor: Joseph Jensen
Associate Managing Editor: Jonathan Barnes
Publication Manager: Cindy Moody
Editorial Assistant: Blaine Haws
Publication Consultant: Pepita Ridgeway
e-Book Specialist: Cicely Potter

MS 179, Utah Valley University, 800 W. University Parkway, Orem, Utah 84058-5999
Phone: 801-863-8804 E-mail: aspcs@aspbooks.org
E-book site: <http://www.aspbooks.org>

PUBLICATION COMMITTEE

Jeff Mangum, co-Chair
National Radio Astronomy Observatory

Joseph Jensen, co-Chair
Utah Valley University

Bruce Elmegreen
IBM Watson Research Center

Lynne Hillenbrand
California Institute of Technology

Doug Leonard
San Diego State University

Chris Packham
University of Texas at San Antonio

Amy Mainzer
Jet Propulsion Laboratory

ASPCS volumes may be found online with color images at <http://www.aspbooks.org>.
ASP Monographs may be found online at <http://www.aspmonographs.org>.

For a complete list of ASPCS Volumes, ASP Monographs, and
other ASP publications see <http://www.astrosociety.org/pubs.html>.

All book order and subscription inquiries should be directed to the ASP at
800-335-2626 (toll-free within the USA) or 415-337-2126,
or email service@astrosociety.org

ASTRONOMICAL SOCIETY OF THE PACIFIC
CONFERENCE SERIES

Volume 521

**ASTRONOMICAL DATA ANALYSIS SOFTWARE AND
SYSTEMS XXVI**

Proceedings of a conference held at
Stazione Marittima, Trieste, Italy
16–20 October 2016

Edited by

Marco Molinaro

*Istituto Nazionale di Astrofisica - Osservatorio Astronomico di Trieste, via
G.B. Tiepolo 11, 34143 Trieste, Italy*

Keith Shortridge

Australian Astronomical Observatory, PO Box 915, North Ryde, NSW 1670, Australia

Fabio Pasian

*Istituto Nazionale di Astrofisica - Osservatorio Astronomico di Trieste, via
G.B. Tiepolo 11, 34143 Trieste, Italy*



SAN FRANCISCO

ASTRONOMICAL SOCIETY OF THE PACIFIC

390 Ashton Avenue
San Francisco, California, 94112-1722, USA

Phone: 415-337-1100

Fax: 415-337-5205

E-mail: service@astrosociety.org

Web site: www.astrosociety.org

E-books: www.aspbooks.org

First Edition

© 2019 by Astronomical Society of the Pacific

ASP Conference Series

All rights reserved.

No part of the material protected by this copyright notice may be reproduced or utilized in any form or by any means—graphic, electronic, or mechanical, including photocopying, taping, recording, or by any information storage and retrieval system—without written permission from the Astronomical Society of the Pacific.

ISBN: 978-1-58381-929-6
e-book ISBN: 978-1-58381-930-2

Library of Congress (LOC) Cataloging in Publication (CIP) Data:

Main entry under title

Library of Congress Control Number (LCCN): ISSN:1080-7926; LCCN: 2019905885

Printed in the United States of America by Sheridan Books, Ann Arbor, Michigan.

This book is printed on acid-free paper.

Contents

Preface	xix
<i>M. Molinaro, K. Shortridge, and F. Pasian</i>	
Participants	xxiii
Conference Photograph	xxxv

Part I. Long-term Management of Data Archives

From ISO to Gaia: a 20-years Journey Through Data Archives Management	3
<i>C. Arviset, D. Baines, I. Barbarisi, S. Besse, G. de Marchi, B. Martinez, A. Masson, B. Merín, and J. Salgado</i>	
The Euclid Archive System: A Data-Centric Approach to Big Data	12
<i>S. Nieto, A. N. Belikov, O. R. Williams, B. Altieri, D. Boxhoorn, G. Buenadicha, B. Droege, J. McFarland, J. Salgado, P. de Teodoro, A. Tsyganov, and E. A. Valentijn</i>	
Towards a Self-healing Archive	16
<i>S. Witz, D. K. Lyons, J. Plank, C. Hausman, R. Lively, J. Arora, and J. Benson</i>	
Instantaneous Archives	20
<i>W. Landry and S. Monkewitz</i>	
The JCMT SCUBA-2 Legacy Release: Unexpected Benefits and Lessons Learned	24
<i>S. F. Graves, G. S. Bell, D. S. Berry, and M. J. Currie</i>	
ESASky: A Simple/Performant Interface on Massive Astronomical Data	28
<i>J. Salgado, B. Merín, F. Giordano, D. Baines, E. Racero, B. López Martí, M. H. Sarmiento, and R. Gutiérrez Sánchez</i>	
Next Generation Firefly for Web Application	32
<i>X. Wu, W. Roby, T. Goldina, E. Joliet, L. Ly, W. Mi, C. Wang, L. Zhang, D. Ciardi, and G. Dubois-Felsmann</i>	
NASA's Long-Term Astrophysics Data Archives	36
<i>L. Rebull, V. Desai, H. Teplitz, S. Groom, R. Akeson, G. B. Berriman, G. Helou, D. Imel, J. M. Mazzarella, A. Accomazzi, T. McGlynn, A. Smale, and R. White</i>	
Long-term Management of 1000s of All-Sky Reference Data Sets Using the HiPS Network	46
<i>P. Fernique, T. Boch, A. Oberto, M. Allen, D. Durand, K. Ebisawa, B. Merin, and J. Salgado</i>	

What Is SIMBAD, and What Is It Not?	50
<i>C. Loup, A. Oberto, M. Allen, S. Lesteven, T. Boch, C. Bot, F. Bonnarel, M. Brouty, C. Brunet, M. Buga, L. Cambrésy, T. Delacour, S. Derrière, A. Eisele, P. Fernique, F. Genova, S. Guéhenneux, G. Landais, M. Louys, A. Nebot, M. Neuville, P. Ocvirk, E. Perret, F.-X. Pineau, A. Schaaff, A. Siebert, E. Son, P. Vannier, B. Vollmer, P. Vonflie, and F. Woelfel</i>	
Linking the Literature to the Data	54
<i>K. Levay, J. Peek, S. Weissman, J. Lagerstrom, A. Marrione, and T. Donaldson</i>	
Discovering European Hubble Science Archive Data	57
<i>M. Arévalo, J. Durán, J. Haase, F. Giordano, R. Gutiérrez, D. Baines, B. Merín, J. Salgado, and C. Arviset</i>	
Building an Interoperable, Distributed Storage and Authorization System	61
<i>S. Bertocco, B. Major, P. Dowler, S. Gaudet, M. Molinaro, and G. Taffoni</i>	
Large Binocular Telescope: INDIGO Solutions for an Astronomical Distributed Archive	65
<i>A. Bignamini, E. Londero, C. Knapic, and R. Smareglia</i>	
Common Access to 2-D and 3-D Galactic Radio Surveys Within the VIALACTEA Project	69
<i>R. Butora, M. Molinaro, and R. Smareglia</i>	
VOAlerts : VO-enabled Data Service Discovery	73
<i>S. Derriere, T. Boch, and L. Gasiorowski</i>	
Decoupling the Archive	77
<i>K. DuPrie, L. Gardner, M. Gough, and R. C. Kidwell Jr.</i>	
Gaia Archive As Part of the Data Generation Process for GDR1	81
<i>J. Durán, J. González, J. C. Segovia, R. Gutierrez, J. Salgado, J. Hernandez, B. Merin, and C. Arviset</i>	
Asiago Astronomical Archive: Status and Features	84
<i>E. Londero, S. Zorba, M. Molinaro, C. Knapic, L. Tomasella, A. Frigo, and R. Smareglia</i>	
Enhanced Capabilities of the ESO Science Archive Facility User Interfaces	88
<i>A. Micol, M. Arnaboldi, N. Delmotte, L. Mascetti, J. Retzlaff, I. Vera, M. Vuong, and S. Zampieri</i>	
Organizing Standardisation of Astronomical Data Access: the DAL WG Current Experience	92
<i>M. Molinaro and F. Bonnarel</i>	
What Is In SIMBAD?	96
<i>A. Oberto, C. Loup, M. Allen, and S. Lesteven</i>	
25 Years of Planetary Data Archiving: Lessons Learned the Hard Way	100
<i>A. C. Raugh and J. S. Hughes</i>	
XMM-Newton Science Archive (XSA)	104
<i>M. H. Sarmiento, M. Arévalo, C. Arviset, D. Baines, E. Colomo, N. Loiseau, B. Merin, and J. Salgado</i>	

The Pipeline for the ExoMars DREAMS Scientific Data Archiving	108
<i>P. Schipani, L. Marty, M. Mannetta, F. Esposito, C. Molfese, A. Aboudan, V. Apestigue-Palacio, I. Arruego-Rodriguez, C. Bettanini, G. Colombatti, S. Debei, M. Genzer, A.-M. Harri, E. Marchetti, F. Montmessin, R. Mugnuolo, S. Pirrotta, and C. Wilson</i>	
IT Support of Space-VLBI Projects: Storage and Processing of Big Data Volume	112
<i>M. V. Shatskaya, A. A. Abramov, N. A. Fedorov, S. F. Likhachev, S. I. Seliverstov, and D. A. Sichev</i>	
Archive, Discover and Match Compact and Diffuse Objects on the Galactic Plane in the VIALACTEA Project	116
<i>R. Smareglia, M. Molinaro, R. Butora, E. Schisano, D. Carey, D. Elia, and S. Molinari</i>	
The Role of the Euclid Archive System in the Processing of Euclid and External Data	120
<i>O. R. Williams, K. Begeman, A. N. Belikov, D. Boxhoorn, B. Droge, A. Tsyganov, J. P. McFarland, E. A. Valentijn, W.-J. Vriend, and C. Dabin</i>	
Transactional Authentication for Data Download	124
<i>T. Winegar</i>	
Long-term Data Management in the SAO RAS Archive System	128
<i>P. O. Zhelenkova, V. V. Vitkovskij, T. A. Plyaskina, V. S. Shergin, and V. N. Chernenkov</i>	
Thirty Years of Echelle Spectra Made Public	132
<i>J. Mink, J. Rhee, and D. W. Latham</i>	

Part II. Surveys for Transient Objects in the Era of Gravitational Wave Astronomy

The AGILE Pipeline for Gravitational Waves Events Follow-up	139
<i>A. Zoli, A. Bulgarelli, M. Tavani, V. Fioretti, M. Marisaldi, N. Parmiggiani, F. Fuschino, F. Gianotti, and M. Trifoglio</i>	
Optimised Workspaces Enhance Time-critical Astronomy	143
<i>B. Meade, C. Fluke, J. Cooke, T. Pritchard, and I. Andreoni</i>	
Prospects About X- and Gamma-ray Counterparts of Gravitational Wave Signals with INTEGRAL	147
<i>P. Bacon, V. Savchenko, E. Chassande-Mottin, and P. Laurent</i>	

Part III. Management of Scientific and Data Analysis Projects

COTS Software In Science Operations, Is It Worth It?	153
<i>W. O'Mullane, N. Bach, J. Hernandez, A. Hutton, and R. Messineo</i>	
The Research Data Alliance: Building Bridges to Enable Scientific Data Sharing	157
<i>F. Genova</i>	

Extending Support for Large Distributed Projects Through Interoperability	161
<i>S. Gaudet, G. Taffoni, S. Bertocco, B. Major, P. Dowler, M. Molinaro, D. Schade, and F. Pasian</i>	
The FRIPON Project or Pride and Prejudice in Citizen Science	165
<i>C. Marmo, F. Colas, S. Bouley, J. Vaubaillon, B. Zanda, P. Vernazza, J. Gattacceca, J.-L. Rault, C. Blanpain, S. Caminade, J. Lecubin, A. Malgoyre, F. Meyer, A. Steinhausser, M. Birlan, L. Maquet, Y. Audureau, and M.-K. Kwon</i>	
Designing Modular Software for Template Fitting Photo-z Estimation	169
<i>N. Apostolakos, H. Degaudenzi, F. Dubath, P. Dubath, N. Morisset, S. Paltani, and M. Schefer</i>	
Optimization of Multi-band Galaxies Cataloguing: Description of the Data Management Pipeline	173
<i>M. J. M. Sanchez, L. M. S. Baro, and T. Budavari</i>	
The Challenges of a Public Data Release: Behind the Scenes of SDSS DR13	177
<i>A.-M. Weijmans, M. Blanton, A. S. Bolton, J. Brownstein, M. J. Raddick, and A. Thakar</i>	
Hosting Astronomical Data in Sharded SQL Databases	181
<i>A. Galkin, K. Riebe, J. Klar, and H. Enke</i>	
SKA Monitor and Control: Harmonization Challenges	185
<i>C. Baffa, E. Giani, and M. Vela Nuñez</i>	
Machine Learning Approaches for Detection and Classification of Astrochemical Spectral Lines	189
<i>A. Barrientos and M. Solar</i>	
DISCOS Project Status and Evolution Towards Continuous Integration	193
<i>M. Bartolini, A. Orlati, S. Righini, M. Buttu, C. Migoni, A. Fara, and S. Poppi</i>	
Visual Analytics in Astrophysics: a Novel Tool Integrated Into VisIVO	197
<i>U. Becciani, F. Vitello, E. Sciacca, A. Costa, A. M. Di Giorgio, S. Molinari, E. Schisano, R. Butora, and M. Molinaro</i>	
Expanding the Breadth of Use of the Montage Image Mosaic Engine	201
<i>G. B. Berriman, J. C. Good, J. Bally, J. Dempsey, M. Lacy, and K. Nyland</i>	
Web-based Quick Data Analysis Tools JUDO2 and UDON2	205
<i>K. Ebisawa</i>	
Evaluation of COTS Tools - Lessons From BepiColombo Provide a Methodical Approach	209
<i>R. Gill, M. Casale, and F. Pérez-López</i>	
Asterics/Obelics Authentication and Authorization: Investigations and Status	213
<i>C. Knapic, A. Costa, M. Molinaro, F. Pasian, and G. Taffoni</i>	
The Binary Star DataBase BDB v3.0	217
<i>D. Kovaleva, O. Malkov, P. Kaygorodov, and B. Debray</i>	
Saada Interfaces	220
<i>L. Michel, and P. Kobersi</i>	

SOCCI - Towards a Common Software Engineering Environment for Science Operations	224
<i>V. Navarro, K. Hanson, K. Lumi, R. Gill, J. Marcos, M. Garcia Reinaldos, J. C. Segovia, M. Fernandez, and R. Alvarez</i>	
The Design Strategy of Scientific Data Quality Control Software for Euclid Mission.	228
<i>M. Brescia, S. Cavuoti, T. Fredvik, S. V. H. Haugan, G. Gozaliasl, C. Kirkpatrick, H. Kurki-Suonio, G. Longo, K. Nilsson, and M. Wiesmann</i>	
Integration of the Data Reduction Pipeline of EMIR During Its Commissioning	232
<i>S. Pascual, N. Cardiel, F. Garzón, N. Castro-Rodríguez, C. González-Fernández, P. Hammersley, E. Manjavacas, and M. Miluzio</i>	
Applicability of Agile Scrum to BepiColombo MPO Science Ground Segment Development	236
<i>F. Perez-Lopez, S. Martinez, J. Gallegos, M. Casale, M. Cuevas, R. Gill, I. Ortiz de Landaluze, N. Fajersztejn, D. Galan, I. Serraller, and M. Freschi</i>	
Probability Density Functions for Astronomy	240
<i>K. L. Polsterer and F. Gieseke</i>	
APERICubes	244
<i>R. Savalle, S. Erard, and P. Le Sidaner</i>	
EasyLife: a Conceptual Framework for Semi-automatic Survey Management . . .	248
<i>P. L. Scala, P. Franzetti, M. Fumana, B. Garilli, and M. Scodreggio</i>	
Debian Astro: An Open Computing Platform for Astronomy	252
<i>O. Streicher</i>	
PF-SPE : A Spectroscopic Redshift Measurement and Spectral Features Extraction Prototype for EUCLID	256
<i>C. Surace, O. Le Fevre, P. Y. Chabaud, Y. Copin, S. Jamal, V. Le Brun, M. Moresco, A. Schmitt, B. Epinat, F. Fauchier, M. Gray, O. Ilbert, L. Tasca, and H. Courtois</i>	
SKA: the Authentication and Authorization System Requirements and Prototype	260
<i>F. Tinarelli, C. Knapic, and A. Bridger</i>	
Collaborative Visual Analytics of Large Radio Surveys	264
<i>D. Vohl, C. J. Fluke, A. H. Hassan, D. G. Barnes, and V. A. Kilborn</i>	
The ASTRODEEP Frontier Fields Portal	268
<i>P. Wassong and S. Derriere</i>	
Implementation of Stellar Parameter Estimation in ASERA	272
<i>H. Yuan, Y. Zhang, H. Zhang, Y. Lei, Y. Dong, Y. Wu, and Y. Zhao</i>	
Managing the ASKAP Computing Project: From Inception to Early Science Operations	276
<i>J. C. Guzman and M. Marquarding</i>	
Virtual Infrastructure Architecture for the <i>StarFormMapper</i>	280
<i>J. M. Herrera-Fernandez, J. M. Blanco, I. de la Calle, A. Ibarra, J. Salgado, and L. Valero-Martin</i>	

SciApp: a Scientific Web Collaboration Tool	284
<i>A. Ibarra, D. Rochholz, R. Saxton, E. Kuulkers, and C. Gabriel</i>	
ASPIC and GAZPAR : National Resources for Observations in Astronomy-Astrophysics at CeSAM	288
<i>C. Moreau, C. Adami, F. Agneray, T. Guillas, and O. Ilbert</i>	
The Management of Risks in the Euclid SGS	292
<i>C. Vuerli, F. Pasian, A. Zacchei, J. Gallegos, and J. Hoar</i>	

Part IV. Reduction and Analysis Algorithms for Large Databases and Vice-versa

Separating Detection and Catalog Production	299
<i>M. Akhlaghi</i>	
An Enhanced Multiwavelength Photometric Catalog for the Spitzer Extragalactic Representative Volume Survey	303
<i>K. Nyland and M. Lacy</i>	
Crossmatching Variable Objects With the <i>Gaia</i> Data	307
<i>L. Rimoldini, K. Nienartowicz, M. Süveges, J. Charnas, L. P. Guy, G. Jevardat de Fombelle, B. Holl, I. Lecoeur-Taïbi, N. Mowlavi, D. Ordóñez-Blanco, and L. Eyer</i>	
Euclid Near-infrared Imaging Reduction Pipeline	311
<i>R. d. Silva, M. Radovich, A. Bonchi, F. Faustini, M. Frailis, G. Polenta, R. Bouwens, P. Capak, K. Jahnke, M. Kazandjian, X. C. Liu, D. Maino, H. Teplitz, S. Wachter, R. Barbier, A. Ealet, B. Kubik, J. Carretero, E. Jullo, M. Schultheis, G. Seidel, S. Serrano, P. Tallada, and N. Tonello</i>	
Application of Compressive Sensing to Gravitational Microlensing Data and Implications for Miniaturized Space Observatories	315
<i>A. Korde-Patel, R. K. Barry, and T. Mohsenin</i>	
Machine Learning Variability Classification in the OGLE Project	319
<i>M. Pawlak</i>	
ASC Correlator and Astro Space Locator Software: Data Processing in "Radioastron" Mission.	323
<i>A. S. Andrianov, I. A. Guirin, V. I. Kostenko, V. E. Zharov, A. G. Rudnitsky, S. F. Likhachev, V. A. Ladygin, and M. V. Shatskaya</i>	
Photometric Conservation in HiPS Processing	327
<i>F. Bonnarel, D. Teodori, P. Fernique, C. Bot, and M. Louys</i>	
Ariadne: a System for Evaluation of AMAZED's Spectroscopic Redshift Estimation Efficiency	331
<i>R. C. Borges, S. Arnouts, P.-Y. Chabaud, F. Fauchier, M. Gray, S. Jamal, V. Le Brun, O. Le Fèvre, A. Schmitt, C. Surace, D. Vibert, and C. Vidal</i>	

Real Time Streaming Analysis of IACT Data	335
<i>K. Bruegge, J. Adam, M. Ahnen, D. Baack, M. Balbo, M. Bergmann, A. Biland, C. Bockermann, J. Buss, M. Blank, T. Bretz, A. Dmytriiev, D. Dorner, A. Egorov, S. Einecke, C. Hempfling, D. Hildebrand, G. Hughes, L. Linhoff, K. Mannheim, K. Morik, S. Mueller, D. Neise, A. Neronov, M. Noethe, A. Paravac, F. Pauss, W. Rhode, T. Ruhe, A. Shukla, F. Temme, J. Thaele, and R. Walter</i>	
QSFit: a New Software for AGN Optical Spectral Analysis.	339
<i>G. Calderone and L. Nicastro</i>	
Advanced Data Reduction for the MUSE Deep Fields	343
<i>S. Conseil, R. Bacon, L. Piqueras, and M. Shepherd</i>	
Computational Intelligence for Stellar Magnetic Fields Parameter Determination	347
<i>J. P. C. Barbosa, S. G. N. Jiménez, and J. C. R. Vélez</i>	
Effect of the Signal to Noise Ratio on the Accuracy of the Automatic Spectral Classification of Stellar Spectra	351
<i>L. Corral, S. G. Navarro, and E. Villavicencio</i>	
Matched Aperture Photometry in the Wide Field Astronomy Unit Science Archives	354
<i>N. Cross, E. Sutorius, M. Read, R. Blake, R. Collins, M. Holliman, and R. Mann</i>	
Solar Image Reconstruction From Visibilities With Compressed Sensing	358
<i>S. Felix, R. Bolzern, M. Battaglia, and A. Csillaghy</i>	
Field Tests for the ESPRESSO Data Analysis Software	362
<i>G. Cupani, V. D’Odorico, S. Cristiani, J. I. González Hernández, C. Lovis, S. Sousa, P. Di Marcantonio, and D. Mégevand</i>	
The ALMA Science Pipeline	366
<i>V. C. Geers, L. Davis, C. A. Hales, B. R. Kent, J. Kern, G. Kosugi, D. Muders, T. Nakazato, K. Sugimoto, S. Williams, and F. Wyrowski</i>	
Data Delivery for the ESA Gaia Data Release 1	370
<i>J. González-Núñez, J. Salgado, R. Gutiérrez-Sánchez, J. C. Segovia, J. Durán, C. Arviset, J. Bakker, U. Lammers, and F. Aguado-Agelet</i>	
Euclid Detections and Science Challenge 3	374
<i>M. Kümmel, E. Merlin, A. Fontana, H. Dole, A. Boucaud, R. Cabanac, M. Castellano, J. Gracia, M. Huertas-Company, H. Israel, J. Mohr, D. Paris, S. Pilo, and T. Vassallo</i>	
Vienna Survey in Orion - VISTA Data Reduction Techniques	378
<i>S. Meingast</i>	
Deblending in Crowded Star Fields Using Convolutional Neural Networks	382
<i>M. Paillassa and E. Bertin</i>	
HiPS Catalogue Generation	386
<i>F.-X. Pineau, T. Boch, and P. Fernique</i>	
Command-line Cross-matching Tool for Modern Astrophysical Pipelines	390
<i>G. Riccio, M. Brescia, S. Cavuoti, A. Mercurio, A. M. Di Giorgio, and S. Molinari</i>	

Mining for Spectra – The Dortmund Spectrum Estimation Algorithm	394
<i>T. Ruhe, T. Voigt, M. Wornowizki, M. Börner, W. Rhode, and K. Morik</i>	
AMAZED: <u>A</u> lgorithm for <u>M</u> assive <u>A</u> utomated <u>Z</u> <u>E</u> valuation and <u>D</u> etermination	398
<i>A. Schmitt, S. Arnouts, R. Borges, P. Y. Chabaud, F. Fauchier, S. Jamal, V. Le Brun, O. Le Fèvre, C. Surace, D. Vibert, and C. Vidal</i>	
Identification of Artifacts and Interesting Celestial Objects in the LAMOST Spectral Survey	402
<i>P. Škoda, K. Shakurova, J. Koza, and A. Palička</i>	
MCMC Algorithms at the Service of Exo-planet Hunters	406
<i>D. Sosnowska, D. Segransan, R. Diaz, N. Buchschacher, and F. Alesina</i>	
All of the Sky: HEALPix Density Maps of Gaia-scale Dataset	410
<i>M. B. Taylor, G. Mantelet, and M. Demleitner</i>	
Dish Washer: a Software Tool for RFI Mitigation in Radio Astronomical Data . .	414
<i>A. Zanichelli, E. Favero, F. Cantini, M. Bartolini, S. Righini, K.-H. Mack, A. Orlati, S. Poppi, F. Gaudiomonte, and G. Serra</i>	
Influence of Different Samples on Photometric Redshift Estimation for Quasars	417
<i>Y. Zhang, Y. Tu, Y. Zhao, and H. Tian</i>	
ARTEMIX - Alma RemoTE Mining eXperiment	421
<i>P. Salome, N. Kasradze, and M. Caillat</i>	
Cross-matching Within the Chandra Source Catalog	424
<i>A. Rots, D. Burke, F. Civano, R. Hain, and D. Nguyen</i>	
Architecture of Processing and Analysis Systems for Big Astronomical Data . . .	428
<i>I. Kolosov, S. Gerasimov, and A. Meshcheryakov</i>	
IBIS-A: The IBIS Solar Spectro-polarimetric Data Archive	431
<i>I. Ermolli, S. Giordano, F. Giorgi, V. Guido, A. Marassi, A. Volpicelli, P. Di Marcantonio, F. Zuccarello, and G. Cauzzi</i>	

Part V. Data Models in Astrophysics

Data Modeling in the Virtual Observatory Framework	437
<i>M. Louys</i>	
The Common Archive Observation Model: Inside the Data Centre	446
<i>P. Dowler</i>	
A Provenance Data Model for Astronomy	450
<i>K. Riebe, F. Bonnarel, M. Louys, F. Rothmaier, M. Sanguillon, and M. Servillat</i>	
Mitigating Radiation Damage Effects in the HST/ WFC3 UVIS Detectors	454
<i>S. Baggett, M. Sosey, and J. Anderson</i>	

Mapping Images and Spectra Metadata With ObsCore DM 458
G. Landais, L. Michel, S. Derriere, P. Ocvirk, and F. Royer

The SkyView Data Model: Handling Heterogeneous Data
 Using Dynamic Software 462
T. McGlynn and L. McDonald

Medicina, Noto and VLBI-IT Radio Archive: Modelling
 Data for Radioastronomy 466
*S. Righini, C. Knapic, A. Zanichelli, E. Dovgan, M. Nanni, M. Stagni,
 M. Sponza, A. Orlati, and R. Smareglia*

Structuring Metadata for the Cherenkov Telescope Array 469
*M. Servillat, C. Boisson, J. Lefaucheur, J. Bregeon, M. Sanguillon,
 J.-L. Contreras, and CTA Consortium*

Part VI. Python in Astronomy

JOVIAL: Jupyter OVerIde for Astronomical Libraries 475
M. Araya, C. Valenzuela, H. Farías, and M. Solar

Sherpa, Python, and Astronomy. A Successful Co-evolution 479
*O. Laurino, D. Burke, J. Evans, W. McLaughlin, D. Nguyen, and
 A. Siemiginowska*

TAP Support in PyVO 483
S. Becker and M. Demleitner

MOCPy, a Python Library to Manipulate Spatial Coverage Maps 487
T. Boch

Satellite Detection in ACS/HST Images 491
D. Borncamp and P. L. Lim

The Hubble Space Telescope Wide Field Camera 3 Quicklook Project 495
*M. Bourque, V. Bajaj, A. Bowers, M. Dulude, M. Durbin, C. Gosmeyer,
 H. Gunning, H. Khandrika, C. Martlin, B. Sunnquist, and A. Viana*

Using Python to Simplify the Automatic Wavelength Calibration of EMI 499
*N. Cardiel, S. Pascual, P. Picazo, J. Gallego, F. Garzón, N. Castro-Rodríguez,
 C. González-Fernández, P. Hammersley, M. Insausti, E. Manjavacas, and
 M. Miluzio*

Reducing Optical Observations with Python 503
S. M. Crawford

Publishing Gaia Science Alerts 507
*A. Delgado, G. Rixon, G. van Leeuwen, S. Hodgkin, D. L. Harrison,
 F. van Leeuwen, and A. Yoldas*

PNGS: an API Ecosystem for Astronomical Applications Development 511
M. Fumana, P. Franzetti, B. Garilli, P. L. Scala, and M. Scodeggio

Python Code Parallelization, Challenges and Alternatives	515
<i>J. Gonzalez, J. Taylor, S. Castro, J. Kern, J. Knudstrup, S. Zampieri, A. Manning, S. Bhatnagar, L. Davis, K. Golap, J. Jacobs, T. Nakazato, D. Petry, M. Pokorny, U. Rao, J. Robnett, D. Schiebel, K. Sugimoto, T. Tsutsumi, A. Wells, and S. Williams</i>	
Porting the LSST Data Management Pipeline Software to Python 3	519
<i>T. Jenness</i>	
Queue Mode Software for Subaru Telescope	523
<i>E. Jeschke, R. Kackley, T. Inagaki, S. Yeh, T.-S. Pyo, F. Nakata, I. Iwata, F. Finet, S. Koshida, K. Helminiak, Y. Koyama, M. Onodera, and N. Arimoto</i>	
SimCADO - a Python Package for Simulating Detector Output for MICADO at the E-ELT	527
<i>K. Leschinski, O. Czoske, R. Köhler, M. Mach, W. Zeilinger, G. Verdoes Kleijn, W. Kausch, N. Przybilla, J. Alves, and R. Davies</i>	
Modelling of Zodiacal Light Emission for Space Missions	531
<i>M. Maris, R. Scaramella, C. Burigana, E. Romelli, J. Amiaux, C. S. Carvalho, J. C. Cuillandre, A. Da Silva, A. De Rosa, J. Dinis, P. Hudelot, E. Maiorano, I. Tereno, and T. Trombetti</i>	
Scaling Up Data Cube Indexing Services for Content-based Searches in the Chilean Virtual Observatory	535
<i>M. Mendoza, A. Barrientos, M. Araya, and M. Solar</i>	
Towards Robotic Operation With the First G-APD Cherenkov Telescope	539
<i>M. Noethe, D. Neise, and S. A. Mueller</i>	
MAISIE: a Multipurpose Astronomical Instrument Simulator Environment	542
<i>A. O'Brien, S. Beard, V. C. Geers, and P. Klaassen</i>	
MPDAF - A Python Package for the Analysis of VLT/MUSE Data	545
<i>L. Piqueras, S. Conseil, M. Shepherd, R. Bacon, F. Leclercq, and J. Richard</i>	
Scalability of an MPI4PY Implementation of a 2D Correlation Code Versus MPI	549
<i>F. Raison</i>	
Wendelstein Observatory Control Software	553
<i>J. M. Snigula, C. Gössl, and A. Riffeser</i>	
COSMO: Using Python and Databases to Monitor HST's Cosmic Origins Spectrograph	557
<i>J. M. Taylor, J. Ely, and M. Fix</i>	
Compression of Smooth One-dimensional Data Series Using Polycomp	560
<i>M. Tomasi</i>	
 Part VII. New Trends in HPC and Distributed Computing	
Shall Numerical Astrophysics Step Into the Era of Exascale Computing?	567
<i>G. Taffoni, G. Murante, L. Tornatore, D. Goz, S. Borgani, M. Katevenis, N. Chrysos, and M. Marazakis</i>	

Massive Scientific Workloads - Lessons Learned From Petaflop-Scale Weather Simulations	577
<i>F. Pierfederici</i>	
HPC Development for the ALMA Pipeline	581
<i>S. Castro, J. Gonzalez, J. Taylor, S. Bhatnagar, M. Caillat, P. Ford, K. Golap, J. Jakobs, W. Kawasaki, J. Kern, M. Kuniyoshi, S. Loveland, D. Mehringer, R. Miel, G. Moellenbrock, T. Nakazato, D. Petry, M. Pokorny, U. Rao, D. Schiebel, K. Kugimoto, V. Suoranta, and T. Tsutsumi</i>	
FACT-Tools – Processing High-Volume Telescope Data	584
<i>J. Buss, C. Bockermann, J. Adam, M. Ahnen, D. Baack, M. Balbo, M. Bergmann, A. Biland, M. Blank, T. Bretz, K. Bruegge, A. Dmytriiev, D. Dorner, A. Egorov, S. Einecke, C. Hempfling, D. Hildebrand, G. Hughes, L. Linhoff, K. Mannheim, K. Morik, S. Mueller, D. Neise, A. Neronov, M. Noethe, A. Paravac, F. Pauss, W. Rhode, T. Ruhe, A. Shukla, F. Temme, J. Thaele, and R. Walter</i>	
Euclid: Using CernVM-FS to Deploy Euclid Processing S/W on Computing Centres	588
<i>M. Poncet, Q. Le Boulc'h, and M. Holliman</i>	
Improving Astronomical Online Services With Apache Spark and Docker	592
<i>A. Schaaff, F.-X. Pineau, N. Wali, P. Trehou, and J. Nauroy</i>	
A Real-time Single Pulse Detection Algorithm for GPUs	596
<i>K. Adámek and W. Armour</i>	
Accelerated Distributed Visualisation in the Theoretical Astrophysical Observatory (TAO)	600
<i>E. Ayling, A. Hassan, T. Dykes, C. Fluke, C. Gheller, and M. Krokos</i>	
A PLC Distributed Layout: the Case of the Instrument Control Electronics of ESPRESSO	604
<i>V. Baldini, G. Calderone, R. Cirami, I. Coretti, S. Cristiani, P. Di Marcantonio, D. Mégevand, and M. Riva</i>	
Pre-feasibility Study of Astronomical Data Archive Systems Powered by Public Cloud Computing and Hadoop Hive	608
<i>S. Eguchi</i>	
The Euclid Science Ground Segment Distributed Infrastructure: System Integration and Challenges	612
<i>M. Frailis, A. Belikov, K. Benson, A. Bonchi, C. Dabin, A. Ealet, M. Fumana, C. Grenet, M. Holliman, G. Maggio, D. Maino, H. J. McCracken, M. Melchior, A. Piemonte, G. Polenta, M. Poncet, P. L. Scala, S. Serrano, and O. R. Williams</i>	
Cloud Driven Multidisciplinary Changes to Computing Infrastructure at Canada France Hawaii Telescope	616
<i>B. C. Kuo Tiong</i>	
A Hybrid Architecture for Astronomical Computing	620
<i>C. Li, C. Cui, B. He, D. Fan, L. Mi, S. Li, S. Yang, Y. Xu, J. Han, J. Chen, H. Zhang, C. Yu, J. Xiao, C. Wang, Z. Cao, Y. Fan, L. Liu, X. Chen, W. Song, and K. Du</i>	

HST/JWST Data Processing Performance Under HTCondor/OWL	624
<i>M. Swam and M. Romelfanger</i>	
Imaging SKA-Scale Data on Cloud and Supercomputer Infrastructure Using Drops and DALiuGE	628
<i>K. Vinsen, M. Boulton, I. Cooper, R. Dodson, M. Dolensky, D. Pallot, R. Tobar, A. Wicenec, and C. Wu</i>	
Application of High Performance Computing and Vectorisation Solutions to Data Analysis for Imaging Atmospheric Cherenkov Telescopes	632
<i>T. Vuillaume, P. Aubert, J. Jacquemier, G. Maurin, and G. Lamanna</i>	
 Part VIII. Miscellanea	
Building a Community of Tech Savvy Astronomers in the Era of Big-data and Data Science	639
<i>A. M. Karick</i>	
Astrophysics Source Code Library: Here We Grow Again!	643
<i>A. Allen, G. B. Berriman, K. DuPrie, J. Mink, R. Nemiroff, T. Robitaille, J. Schmidt, L. Shamir, K. Shortridge, M. Taylor, P. Teuben, and J. Wallin</i>	
Photometric Aperture Corrections for the ACS/SBC	647
<i>R. J. Avila and M. Chiaberge</i>	
VISIOMATIC 2: a Web Client for Remote Visualization With Real-time Mixing of Multispectral Data	651
<i>E. Bertin, C. Marmo, and H. Bouy</i>	
Hosts, Guests and Shadows: Scheduling the SKA Telescopes	655
<i>A. Bridger, S. Reed, R. S. Thompson, S. J. Williams, and M. Nicol</i>	
Using Nagios to Monitor the Telescope Manager (TM) of the Square Kilometer Array (SKA)	659
<i>M. Canzari, M. Di Carlo, M. Dolci, and R. Smareglia</i>	
SIRENA: Software for Athena X-IFU Event Reconstruction	663
<i>M. T. Ceballos, B. Cobo, P. Peille, J. Wilms, T. Brand, T. Dauser, S. Bandler, and S. Smith</i>	
Software Integration for the ASTRI SST-2M Prototype Proposed for the Cherenkov Telescope Array	667
<i>V. Conforti, E. Antolini, L. A. Antonelli, P. Bruno, A. Bulgarelli, R. Canestrari, O. Catalano, A. Costa, V. Fioretti, S. Gallozzi, F. Gianotti, A. Grillo, F. Lucarelli, G. Malaguti, M. Mastropietro, F. Russo, P. Sangiorgi, J. Schwarz, S. Scuderi, C. Tanci, G. Tosti, M. Trifoglio, V. Testa, S. Vercellone, F. Vitello, A. Zoli, M. Bartolini, A. Orlati, ASTRI Collaboration, and CTA Consortium</i>	
MOC Facets: For Spectra and Images	671
<i>D. Durand, P. Fernique, T. Boch, L. Michel, and F. X. Pineau</i>	
2dFdr - One Million Spectra and Counting	675
<i>T. Farrell, M. Birchall, S. Croom, and C. Lidman</i>	

MOSCA: A Generic Library for MOS Data Reduction	679
<i>C. E. García-Dabó and S. Möhler</i>	
Characterising Radio Telescope Software With the Workload	
Characterisation Framework	683
<i>Y. G. Grange, R. Lakhoo, M. Petschow, C. Wu, B. Veenboer, I. Emsley, T. J. Dijkema, A. P. Mechev, and G. Mariani</i>	
An Evolving Solar Data Environment	687
<i>N. Hurlburt, S. Freeland, and R. Timmons</i>	
Progress of Computer and Network Replacement at Subaru Telescope	691
<i>J. Noumaru, T. Winegar, E. Kyono, H. Yamanoi, and K. Schubert</i>	
Catalogue of the XMM-Newton Pipeline Products. Present and Future	695
<i>J.-V. Perea-Calderón, P. Rodríguez-Pascual, E. Ojero-Pascual, L. Tomás, and C. Gabriel</i>	
XID+, a New Prior-based Extraction Tool for Herschel-SPIRE Maps	699
<i>Y. Roehlly and P. D. Hurley</i>	
Usage of an End-to-End Simulator for Instrument Operations	703
<i>E. Romelli, P. Battaglia, A. Gregorio, and R. Franco</i>	
Update of the JVO Subaru Suprime-Cam Mosaic Image Archive	707
<i>Y. Shirasaki, C. Zapart, M. Ohishi, and Y. Mizumoto</i>	
ALMA Science Archive: Construction	711
<i>F. Stoehr, A. Manning, C. Moins, D. Jenkins, M. Lacy, S. Leon, K. Nakanishi, E. Murphy, and S. Gaudet</i>	
An Automated Galaxy Recognition and Redshift Measurement System for Low- resolution Spectra	715
<i>J. Zhang, Y. Wu, and X. Chen</i>	
APOGEO: an Automatic Management System for Astronomical Portals	719
<i>S. Zorba, A. Bignamini, F. Cepparo, C. Knapic, M. Molinaro, and R. Smareglia</i>	
AstroNOMical Information System Version 3	723
<i>F. Agneray and C. Moreau</i>	

Part IX. BoF Sessions, Demo Booths and Focus Demo

Operations in the Era of Large Distributed Telescopes	729
<i>Y. G. Grange, K. Vinsen, J. C. Guzman, J. A. Parra, J. D. Mol, R. Renil, and C. Schollar</i>	
FITS and Data Representations WG BoF Session	733
<i>L. Chiappetti, J. Mink, A. Dobrzycki, and M. Taylor</i>	
Implementing Ideas for Improving Software Citation and Credit	737
<i>P. Teuben, A. Allen, G. B. Berriman, K. DuPrie, J. Mink, T. Robitaille, K. Shortridge, M. Taylor, and R. Warmels</i>	

The Centre de Données Astronomiques de Strasbourg - a Science Driven Data Centre	741
<i>M. G. Allen and the CDS team</i>	
ASTERICS - Astronomy ESFRI and Research Infrastructure Cluster	745
<i>G. Cimò, R. van der Meer, M. de Vos, F. Genova, G. Lamanna, S. Serjeant, A. Szomoru, and F. Pasian</i>	
SciServerCompute: Bring Analysis Close to the Data	749
<i>M. J. Raddick, J. W. Kim, G. Lemson, D. Medvedev, and M. Taghizadeh-Popp</i>	
ALMAWebQL v2: a Modern Interactive Client-server Architecture for Fast Previewing of Large ALMA Datasets	753
<i>C. Zapart, Y. Shirasaki, M. Ohishi, Y. Mizumoto, W. Kawasaki, T. Kobayashi, G. Kosugi, and S. Eguchi</i>	
DACE: New Available Visualisation and Analysis Tools for Exoplanet Research	757
<i>N. Buchschacher and F. Alesina</i>	
 <i>Author Index</i>	 761
 <i>Subject Index</i>	 771
 <i>ASCL Index</i>	 787

Preface

This volume of the ASP Conference Series contains papers presented at the twenty-sixth annual conference for Astronomical Data Analysis Software and Systems, also known as ADASS XXVI, held in Trieste, Italy, October 16-20 2016.

The ADASS Conference Series provides a forum for scientists and programmers concerned with algorithms, software, and software systems employed in the acquisition, reduction, analysis, dissemination, storage and retrieval of astronomical data. An important element of the program is to foster communication between developers and users with a range of expertise in the production and use of software and systems. The program consists of invited talks, contributed oral and display papers, tutorials, user group meetings, and special interest group meetings (called BoFs).

1. Conference Overview

ADASS XXVI was hosted by the Trieste Astronomical Observatory of the Italian National Institute for Astrophysics (INAF-OATs), in collaboration with Università di Trieste (UniTS) and Comune di Trieste. The conference was held in the “Stazione Marittima” Conference Centre. Surrounded by the sea on three sides, located just a few meters from the main square (Piazza Unità d’Italia), the “Stazione Marittima” is one of Trieste’s most significant historical landmarks.

ADASS XXVI called for contributions addressing the following key themes:

- Reduction and Analysis Algorithms for Large Databases and Vice-versa
- Management of Scientific and Data Analysis Projects
- New Trends in HPC and Distributed Computing
- Long-term Management of Data Archives
- Data Models in Astrophysics
- Python in Astronomy
- Surveys for Transient Objects in the Era of Gravitational Wave Astronomy

There were 314 registered participants, representing 28 countries in all continents. There were 11 students, and 16 participants received financial support.

The conference started on Sunday October 16 with two very well attended tutorials (over 100 persons each). Over the three and a half days of the conference, there were 9 invited talks, 39 oral contributions, 164 posters, 4 BoF sessions, 2 focus demos, and 11 demo booths (4 commercial, 7 institutional).

A brand new social project (“Drops Of ADASS”) was available, aimed at allowing anyone working on ADASS topics to share his/her work in 90-second videos, in which they could explain who they are, their research and why it is interesting for the ADASS community.

ADASS XXVI was followed by the International Virtual Observatory Alliance (IVOA) Interoperability Workshop, held on October 21-23 at the same location. Of the 109 participants in the IVOA Workshop, 88 had participated in ADASS as well.

2. Social Events

On Sunday the tutorials were followed by a welcome reception in the Magazzino 42 area of the “Stazione Marittima” building. Participants had the opportunity to network with their ADASS colleagues in a pleasant and scenic location, while enjoying the taste of the local cuisine.

On Monday, a Gala Dinner was held at the Savoy Restaurant of the Savoia Excelsior Palace, one of the historical palaces of Trieste, now a 5-star luxury hotel.

On Tuesday, the “Connections” concert was held. Concertos K414 and K449 for piano and strings by Mozart were performed by the orchestra of the “G. Tartini” Conservatorium in Trieste and by a pianist located at the Academy of Music of the University of Ljubljana, 120 km away. The LOLA (LOW LATency) hardware/software ultra-low-latency audio-visual streaming system was used for the event. A reception held at the Birreria Forst was associated with the concert.

On Monday, Tuesday and Wednesday mornings, there was an ADASS XXVI Jogging Wakeup, in which LOC members, starting from the “Stazione Marittima”, led participants in a jogging discovery of the Trieste harbour.

3. Proceedings Overview

Of the 229 contributions to ADASS XXVI, about 80% were submitted for these proceedings, for a total of 182 papers. Over the years, the volume and complexity of data presented in papers have made the use of colours an intrinsic part of many figures, some of which can be quite intricate. For this reason, readers are encouraged to consult the electronic version of these proceedings in order to see figures in colour, and to zoom in as needed. The online proceedings are available on the ADASS website¹.

4. People and Institutions behind the Conference

Many people and institutions are needed to organize a conference, from the program itself to all the logistic aspects involved, to the funding needed to get things implemented.

The ADASS XXVI Program Organizing Committee (POC) was chaired by Nuria Lorente (AAO) and included Pascal Ballester (ESO), Sebastien Derriere (CDS), Mike Fitzpatrick (NOAO), Carlos Gabriel (ESA-ESAC), Stephen Gwyn (CADC), Jorge Ibsen (ALMA), Tony Krueger (STScI), Kathleen Labrie (Gemini Observatory), Mark Lacy (NRAO), Jim Lewis (IoA), Fabio Pasian (INAF-OATs), Arnold Rots (SAO), Keith Shortridge (AAO), Mauricio Solar (UTFSM), Tadafumi Takata (NAOJ), Harry Teplitz (IPAC/ Caltech).

The Local Organizing Committee (LOC) was co-chaired by Fabio Pasian (INAF-OATs) and Stefano Borgani (UniTS and INAF-OATs), and included Carlo Baccigalupi (SISSA), Guido Cupani (INAF-OATs), Simonetta Fabrizio (INAF-OATs), Federico Gasparo (INAF-OATs), Giorgio Giorgetti (Uni TS), Giulia Iafrate (INAF-OATs), Marco Molinaro (INAF-OATs), Erik Romelli (UniTS - INAF-OATs - Science Industries),

¹<http://adass.org/proceedings.html>

Gabriella Schiulaz (INAF-OATs), Giuliano Taffoni (INAF-OATs), Daniele Tavagnacco (INAF-OATs - Science Industries), Claudio Vuerli (INAF-OATs).

The secretariat was provided by The Office, Professional Congress Organizers. Other people gave important support: Sara Bertocco, Thomas Gasparetto, Elisa Londero, Stefano Sartor, Sonia Zorba among others. Special thanks are due to Guido Cupani, who gave an extremely valuable help in the reviewing papers, and to Francesco Cepparo, who gave priceless contributions to the construction of these proceedings.

Finally, we gratefully acknowledge the financial support of the conference sponsors INAF, the ADASS partners, Fondazione CRTrieste, Consorzio per la Fisica di Trieste, SISSA, Altec, E4 Computer Engineering, Eurotech; the collaboration of Università di Trieste, Comune di Trieste, Regione Autonoma Friuli Venezia Giulia, MHPC; and in particular the support of the LightNet consortium and of Science Industries.

5. ADASS Information

Details about ADASS XXVI are available on the Web². Past conferences are listed on the ADASS webpage³. ADASS XXVII is hosted in Santiago, Chile, in October 2017; ADASS XXVIII is hosted in College Park, MD, USA in November 2018.

Marco Molinaro
Keith Shortridge
Fabio Pasian

²<http://www.adass2016.inaf.it>

³<http://www.adass.org>