TWENTY YEARS OF ADASS

COVER ILLUSTRATION:

The ADASS conferences have taken place each year since 1991, and address wide ranging topics covering all facets of astronomical software. This figure is a composite of the conference logos or posters from the first twenty conferences, arranged in order from ADASS I (Tucson) to ADASS XX (Boston).

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ASTRONOMICAL SOCIETY OF THE PACIFIC
CONFERENCE SERIES

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TWENTY YEARS OF ADASS

A retrospective of the first twenty years of the
Astronomical Data Analysis Software and Systems
conference series

Edited by

Ian N. Evans
Smithsonian Astrophysical Observatory, Cambridge, Massachusetts, USA

The editors of the ADASS I–XX proceedings volumes

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Web site: www.astrosociety.org
E-books: www.aspbooks.org

First Edition

ASP Conference Series

ISBN: 978-1-58381-???-?
e-book ISBN: 978-1-58381-???-?

Library of Congress (LOC) Cataloging in Publication (CIP) Data:
Main entry under title
Library of Congress Control Number (LCCN): **LCCN**

Printed in the United States of America by Sheridan Books, Ann Arbor, Michigan.
This book is printed on acid-free paper.

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Foreword

The Astronomical Society of the Pacific Conference Series is twenty-five years old this year. For nearly that entire time, the ASP has been proud to partner with the organizers of the Astronomical Data Analysis Software and Systems (ADASS) conferences to publish the latest data analysis techniques and software developments as they pertain to astronomy and astrophysics. The ADASS volumes have been particularly important to the astronomical community because they represent one of the only places where the work of hundreds of researchers and programmers can be publicly accessed, cited, and shared.

During the 20 years of ADASS conferences represented in this book, the computer software and techniques used by astronomers to conduct their work has experienced nothing short of a revolution. When the ADASS meetings started, the Internet was in its infancy, and the ability to communicate data and results broadly and rapidly was still a dream. In the first 20 years of our collaboration, the ASP and ADASS together have published 2,677 papers that have been read on-line more than 150,000 times and cited more than 13,000 times. For the past few years, ADASS and the ASP have partnered to increase the impact of the conferences by allowing free and open access to all ADASS articles immediately upon publication. The readership and citation statistics testify to the lasting impact the ADASS meetings are having within the community and the importance of rapid electronic access to articles.

The ASP Conference Series staff—past, present, and future—is proud to be part of the tradition of academic excellence established by 20 years of ADASS participants, and looks forward to a bright future full of technological and computational advances that will reveal the secrets of our universe. As this book goes to press, the twenty-second ADASS conference proceedings to be published by the ASP is nearing completion and the twenty-third ADASS meeting is being planned. We hope this commemorative 20th anniversary volume helps you see just how far we have come and provides context for the advances that are coming at an accelerating pace. It is an exciting time to be part of the collective endeavor of exploring our universe!

J. Jensen
Managing Editor
ASP Conference Series
30 May 2013

Preface

"Astronomical research has been revolutionized by the rapid growth in computing and networking and strongly influenced by the trend towards distributed processing." Thus was introduced the preface of the proceedings of the First Annual Conference on Astronomical Data Analysis Software and Systems (ADASS), held in Tucson, Arizona, November 6–8, 1991 (see Figure 1). The pioneering organizers of the first ADASS meeting recognized that astronomical software is constantly at the forefront of technological innovation. Indeed, much of the revolution in astronomical research over the last two decades has been made possible due to continuing rapid advances in astronomical computing and software. At the time, it is unlikely that those same organizers would have anticipated the degree to which the ADASS conferences have become the premier forum for discussions about astronomical software and cross-fertilization of ideas between professionals working in this area.

While the emphasis of the ADASS conferences has evolved as new software technologies have developed, their organization has remained relatively stable. In recent years, each ADASS conference has included several invited talks focused on a set of conference key topics chosen each year by the Program Organizing Committee (POC), together with general oral and poster presentations. Opportunities to display existing software include floor demonstrations, which usually run for duration of the conference and provide a mechanism to present (and interact) with software that may be of general interest, and focus demonstrations that are typically short planned presentations that highlight new, interesting, or innovative software. Each conference also hosts several "Birds of a Feather" (BoF) sessions on special topics of interest to the astronomical software community that foster technical discourse and exchange of views. Finally, each conference is usually immediately preceded by one or more tutorial sessions that are aimed at explaining new technologies and techniques.

1.1. Twenty Years of ADASS

Discussions between the editors of the ADASS XX proceedings volume and the managing editor of the Astronomical Society of the Pacific (ASP) Conference Series (the publishers of the ADASS proceedings volumes) raised the idea that there might be interest in a retrospective volume of the first twenty years of ADASS conferences. Following discussions with the ADASS POC, ASP agreed to publish this Twenty Years of ADASS volume with editorial guidance and help from the ADASS community.

We could not possibly include all of the worthy papers in a single volume of this size, so an immediate question was "How do we select the papers to be included in the twenty years retrospective?" We elected to defer the question to the editors of each of the first twenty ADASS proceedings volumes. The editors were given the opportunity to select roughly half a dozen articles from their volume that seemed to be particularly significant or interesting to them. While this approach enables us to identify papers that reflect on the state of the art at each conference, or that have had long-reaching consequences for the future of astronomical software development, it also allows us to retain more ephemeral articles that were of current interest at the time, and that retain the flavor of each of the individual conferences. A (very) few highly referenced articles that got missed were subsequently added, and a few close duplicates were eliminated. To those authors whose papers were not included, we can only apologize — the reason

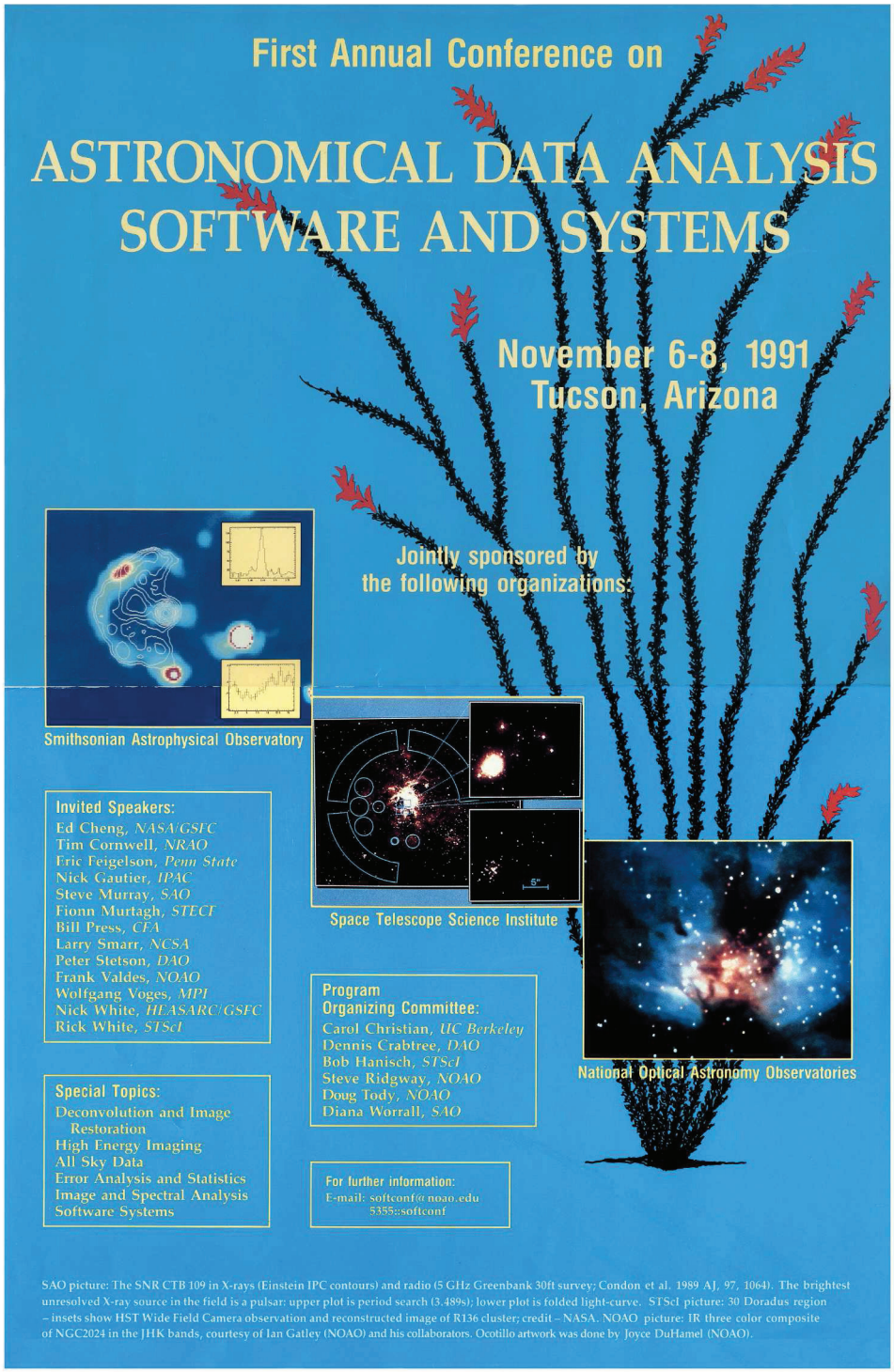

Figure 1. Poster advertising the first ADASS conference (scanned, courtesy of Betty Stobie).

was strictly one of available space. Leafing through the volume you will notice considerable variation in style between articles from different years. This was intentional. Since this is a retrospective volume, we have tried to retain the original "look and feel" of each article as much as possible.

1.2. Acknowledgements

The editors would like to express our gratitude for the dedication and hard work by the members of the ADASS POC (past and present) and also the local organizing committee members who ensured that each year's conference was a great success. The lead editor would also like to thank the editors of the individual ADASS I–XX proceedings volumes for their efforts in reviewing and selecting the various articles that comprise this retrospective volume.

On behalf of the entire ADASS community, the editors wish to acknowledge the financial, material, and staff support of the various supporting organizations, conference sponsors, and host institutions throughout the years. We also wish to thank the Astronomical Society of the Pacific for supporting the publication of this retrospective volume.

1.3. Further Information

Details concerning the ADASS meetings, as well as electronic versions of many of the proceedings, may be found on the ADASS web site: `http://www.adass.org`.

Ian N. Evans, July 2012
Smithsonian Astrophysical Observatory
Cambridge, MA, USA
On behalf of the ADASS I–XX proceedings editors

Program Organizing Committee Preface

In memoriam of our former POC colleague and main organizer of ADASS 2009 in Sapporo, Koh-Ichiro Morita, who tragically passed away May 7th, 2012.

How can it be twenty years already? Since its creation in 1991, the Astronomical Data Analysis Software and Systems (ADASS) conference series has been capturing and promoting the hard work of hundreds of scientists and engineers working in software related to the science of astronomy. From an astronomical point of view, twenty years is a very short period of time. However, when discussing computer science topics it is obvious that twenty years of change has an impact which, in other disciplines, might be seen only over a time frame measured in centuries.

Many new computer science developments occurred during this twenty-year period and it is quite difficult to capture in a few lines the main highlights of past ADASS conferences. We can state without any hesitation that we witnessed many revolutions, but most of these pale in comparison to the importance of the Internet and its impact on our day-to-day personal and professional live.

The first six ADASS conferences were held in North America, as this conference was born as a North-American one, but from a careful examination of the list of attendees it is obvious that an important fraction (30%) of the early participants came from abroad. As a result the ADASS Program Organizing Committee (POC) implemented with time a more balanced selection of conference venues, and this has reflected the international community quite well. While in the first eleven years only one ADASS was held outside the North-American continent, in the following ten, four have taken place in Europe and one in Japan. The plan for the next years includes South-America and Australia as future venues. Our goal in choosing such sites is not to be exotic but rather to make an attempt to promote and give a voice to scientists, engineers, and entire facilities whom often perform their important astronomy-related work with very little recognition or fanfare. The composition of the POC itself reflects very well the international character of the conference.

When browsing through the thousands of ADASS contributions published to date, one can easily notice that while some projects would sometimes disappear or never be implemented others would be incredibly successful. As is the case for any healthy scientific discipline, there is a "natural" selection mechanism in place. However, even from the occasional ill-fated projects one could still learn about the procedures and the decision processes that took place in their development (and perhaps led to their demise).

We also witnessed another revolution in our field: the birth of the International Virtual Observatory (IVO) project occurred officially at Caltech in 2000 but the critical importance of the topic was quickly recognized by the ADASS organizers. The first talk dedicated to the VO was given at the Victoria meeting in 2001, dozens follow in the years after, and we can proudly say that ADASS has helped a lot to shape VO, through presentations and discussions of participants working in different VO matters, but also through cross-fertilization with scientists and engineers who have only been tangentially involved.

Attendance at ADASS conferences over the past twenty years has been very stable (if one ignores the effects of 9/11 which impacted the 2001 Victoria meeting quite

severely) and this is a reassuring confirmation of the vitality of our community, even while we pass through a very trying economic period.

A POC lunch / dinner is scheduled during the course of each ADASS conference and we often discuss the future of our printed proceedings. We all agree that we would like to have access to more timely and dynamic content with a system that could easily capture the complex nature of what we want to demonstrate through our contributions. We are slowly evolving towards this goal but we all also feel that continuing to have a permanent record of our hard work in the form of the ADASS proceedings is very important.

By looking backwards, one quickly realizes the massive amount of work that we have all accomplished during the last twenty years. We have tried to capture a feeling for these successes in this special anniversary edition of ADASS manuscripts. Not surprisingly, it has been a very difficult and (since we are not aware of an appropriate algorithm for carrying out the task!) a very subjective exercise. On occasion it was also great fun to read old articles and realize that today a few lines of modern scripting code could reproduce what used to take many months of dedicated work.

What we also glean from our review of past proceedings is that the ADASS community is a very vibrant one and it is the participants themselves who make the ADASS venture so very worthwhile. Hundred of hours of work are required to make preparations for each meeting in order to create a very special environment, which will foster communications and collaborations between the attendees. We should also not neglect the amount of work done behind the scenes; every Local Organizing Committee (LOC), which we usually forget shortly after the final word of a given meeting, contributed significantly to the historical success of the first twenty ADASS conferences.

We would like to thank all of the people who have contributed time and effort to the preparation of this special anniversary edition of ADASS papers, including all the past editors. We encourage all interested scientists and engineers to attend our meetings and continue to foster the *raison-d'être* for the ADASS conferences.

David Bohlender
Daniel Durand (POC Vice Chair)
Carlos Gabriel (POC Chair)

Twenty Years of ADASS
Ian N. Evans and the editors of the ADASS I–XX proceedings volumes, eds.

Twenty Years of ADASS[1]

Robert J. Hanisch[1,2]

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On the occasion of the twentieth ADASS Conference, I am honored to be asked to say a few words in reflection of the past two decades.

The idea for an annual conference about astronomical software arose in 1990 from the IRAF group at NOAO and with encouragement from the other organizations then collaborating on IRAF-based software: STScI (STSDAS) and CfA (PROS). Doug Tody (e-packrat!) has e-mail evidence of the original planning:

```
From tody@coma Fri Feb  9 11:50:46 1990
Date: Fri, 9 Feb 90 11:49:34 MST
From: tody@coma (Doug Tody  CCS)
Message-Id: <9002091849.AA00458@coma.noao>
Subject: IRAF conference
Cc: tody
Status: O

I am convinced that the IRAF conference (or astronomical software
conference) that we discussed earlier is a good idea, and now is
the time to do it.  We need to contact the other centers, let them
know we want to do this, and form an organizing committee. ...
```

Doug and NOAO agreed to host meeting #1 in Tucson, and I led a proposal to NASA for funding. (I guess this has long been the pattern — Doug does the work and Bob finds the money!) I am pretty sure that Doug and I coined the "ADASS" label, specifically to go beyond the idea of an "IRAF meeting" and to bring a focus on astronomical software development to the U.S. Europe held sway at this time, with the triennial Data Analysis Workshops in Erice, Sicily, and annual meetings at ESO.

ADASS I was certainly a big success. It was definitely not just an "IRAF meeting," but it was largely about the "big systems" of the day: MIDAS, AIPS, GIPSY, and IRAF, and the original ADS and ESIS data access systems. Plus FITS, data compression, deconvolution, and with what is now the well-established pattern of papers and posters about image and spectral analysis, pipeline processing, statistics, and algorithm development.

There is not time to give a detailed history of ADASS meetings, but in perusing the Proceedings (the hardcopies from my office shelf!) a few notable events and trends stand out. This is an incomplete and biased synopsis!

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[1]After-dinner remarks presented at the ADASS XX conference banquet.

- ADASS II, Boston, 1992: AIPS++, STARLINK, IDL, i.e., continued focus on big systems/environments. Election day and fireworks inside the hotel ballroom.
- ADASS III, Victoria, 1993: The World-Wide Web crashes the gates.
- ADASS IV, Baltimore, 1994: Continued emphasis on WWW and network-based information services. The "new ADS." Object-oriented databases. Data models.
- ADASS V, Tucson, 1995: Object-oriented software. FADS-I (Future of Astronomical Data Software) and the Gaming Table, that is, a common framework that could support interoperability of software components. This is a goal that continues to be pursued.
- ADASS VI, Charlottesville, 1996: FADS-II, AIPS++, Java.
- ADASS VII, Sonthofen, 1997: ADASS takes Europe! Pipelines, planning and scheduling, simulation and high-end computation. First appearance of Education and Public Outreach. And humongous amounts of pork and beer at the banquet.
- ADASS VIII, Urbana, 1998: Rain. Sorry, my first missed ADASS. Very diverse program. Ray Plante's recollection: Java Java Java.
- ADASS IX, Kona, 1999: Python and XML. Data mining and sky surveys. Management of the software development process. And Carlos and I find a common interest in jazz piano, to the pleasure of a least some of the conference participants and the irritation of the hotel staff, who asked us to stop and leave. Then the subsequent migration of the some dozens of people to the Buddha Point for "meditation," where we were again asked to leave by hotel security staff. Some people just do not appreciate modern software development methodologies!
- ADASS X, Boston, 2000: NVO (Szalay) and surveys. And a first historical perspective from Keith Shortridge.
- ADASS XI, Victoria, 2001: Post 9/11, with limited attendance. VO, VO, VO, VO. And grid computing and pipelines.
- ADASS XII, Baltimore, 2002: The VO story evolves, web services enter the scene.
- ADASS XIII, Strasbourg, 2003: VO permeates rather than grand-stands. Resurgence in image restoration. Biggest ADASS ever, with 363 people. Perhaps they came for the food. Which reminds me of my friend and colleague who likes to drink fine French cognac the American way, like a tequila shooter at a sports bar.
- ADASS XIV, Pasadena, 2004: Much promotion about space- and ground-based observatories. First (and hopefully last) conference dinner at a horse-racing track.
- ADASS XV, San Lorenzo de El Escorial, 2005: Parallel and distributed computing, data quality. VO "in transition" (well, we hoped!) And a spectacular annular solar eclipse. Bravo to the LOC for that one!
- ADASS XVI, Tucson, 2006: Petabyte databases and all things supersized. Quality control in software development. Advanced visualization.

- ADASS XVII, London, 2007: Data preservation is more than an archive. Certain of us lampooned by David Schade (a la Monty Python and the Holy Grail ... now where did I put the coconuts?) This, alas was the last ADASS meeting for our friend and colleague Peter Bunclark.

- ADASS XVIII, Québec, 2008: Google Sky and WWT. And I think the first Proceedings with papers grouped by sessions rather than topics.

- ADASS XIX, Sapporo, 2009: Large systems and "dangerous practices" (perhaps a reference to the typhoon?) Time domain software, and reflections on the VO. First in-absentia presentation, by me.

- ADASS XX, Boston, 2010: The meeting is not over yet, but something like embracing the commercial wave might be the thing (Cloud, Hadoop, MapReduce, and imaginatively named query languages like Pig; the latter topic might have been more appropriate for the Sonthofen meeting).

ADASS is THE venue for discussion of all things related to astronomical software, and is where the key developments in computer technologies get introduced to our community. ADASS supports career development for our software professionals by providing a forum — with a paper/electronic trail — for describing their accomplishments.

That said, ADASS has not worked as well as we had originally hoped as a means for engaging the research community in a discussion about software needs, nor has it brought about the level of software sharing and re-use that I thought we could achieve. Other communities seem to do better in this regard, for example, with on-line collaboratories such as myExperiment. But perhaps it is just the nature of the beast, as there is a balance between doing things locally vs. spending the effort needed for effective collaboration across different organizations (as we know well from the VO experience.) Keith Shortridge has started the AstroShare[1] Wiki to help keep the ADASS-based dialog going year-round.

This has taken my allotted ten minutes and then some, I suppose. So before Arnold gets out his hook, I will conclude by saying how good it is to see something one helps to start succeed so well. I thank POC chairs Rick Harnden, Dick Shaw, and Arnold Rots and all those who have served on POCs and LOCs over the years for continuing what we started in 1991, the many organizations who have provided financial support, and all of you who continue to attend, present, listen, and share. In particular, I would like to acknowledge the four people who have attended each of the 20 ADASS meetings: Betty Stobie, Bill Pence, Daniel Durand, and Doug Tody. To you I say, "Get a Life!" And to Carlos Gabriel, good luck with the next 20 years!

[1] `https://www.astroshare.org/`