

THE “SCIENTIFIC WRITING FOR YOUNG ASTRONOMERS” (SWYA) PROJECT

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Abstract. This paper describes the origins of the *Scientific Writing for Young Astronomers* (SWYA) project, and presents a short overview of the contents of the SWYA Schools organised in 2008 and 2009. The scope and the future of the SWYA teachings is documented.

1. Introduction: The SWYA project

Courses in scientific writing abound at many universities, and are sometimes included in the curriculum of a doctoral training program. These courses are mostly of a generic character (*i.e.*, they are offered in a faculty-based context), yet very few discipline-specific scientific writing courses are being put up. Some detailed tutoring in written and in oral scientific communication for astronomy students was presented by Kurtz (2006) and by Sterken (2006) as an experiment in the framework of a workshop for PhD students that was organised in 2005 in Pécs (Hungary), see Sterken & Aerts (2006).

In 2007 the Board of Directors of *Astronomy & Astrophysics* (A&A) and *EDP Sciences*, the Publisher of A&A, decided to organise an entire School on the various aspects of scientific writing and publishing in astronomy, *viz.*, a three-day teaching event on key aspects of scientific writing. A first *Scientific Writing for Young Astronomers* (SWYA) School was thus organized in 2008, and a second one in 2009. The Schools were financed by A&A and by *EDP Sciences*, who also provided all logistic support.

2. The purpose of the SWYA School

The purpose of the SWYA project was twofold:

1. to teach young PhD students how to express their scientific thoughts and results through adequate and efficient written communication, and
2. to discuss the operation of A&A as an example of an international peer-reviewed journal in astronomy.

Questions, such as

- what makes one author a good communicator and another a poor one,
- how to communicate scientific results through adequate scientific writing,
- how does the editorial process of a journal function, and why need scientific papers be refereed

(and many more) were dealt with in depth.

3. The SWYA School venue, format and audience

The schools took place in Hotel and Conference Center *Azaert* in the city of Blankenberge, on the North Sea coast of Belgium. That (scientifically) uneventful location was selected on the basis of its very attractive out-of-season accommodation prices, its excellent conference facilities, and because the entire hotel facility was reserved solely for SWYA participants.

Shortly after releasing the first announcement in 2007, we saw that the overwhelming response would soon lead to an oversubscription factor of more than 100%, so attendance was consequently restricted to beginning PhD students, with a maximum of two participants from a same institute. At the same time, we strove for a 50/50 gender balance of the student population. Finally, about 65 students were accepted for the first event (2008), and a similar number participated in the second School one year later.

Both Schools were directed by C. Sterken, and involved more than half a dozen additional lecturers, among which some A&A Editors (Claude Bertout, Thierry Forveille and Steve Shore), A&A Language Editors (Joli Adams and Martine Usdin) and external lecturers (Uta Grothkopf from the *European Southern Observatory*, Laurent Cambrésy from the *Centre de Données astronomiques de Strasbourg*, and Jean-Marc Quilbé from *EDP Sciences*). The format of both events was chosen to be a combination of the open and traditional classroom type, with teachers stimulating student interest by their own lecturing performance. In addition, the SWYA 2009 School included hands-on sessions, during which groups of students received interactive tutoring from the A&A language editors.

4. The SWYA Proceedings

Most lectures were published in full in the SWYA Proceedings (Sterken 2011a, 2011b) as Volumes 49 and 50 in the *EAS Publications Series*.¹ The organization of these Proceedings, though not a faithful record of the lectures, closely reflects the structure of the Schools. The books contain papers about the editorial office and the Editors, the Publisher, the business models in journal publishing, the journal A&A, the refereeing process, bibliometric databases, and library services. They also comprise papers about how to write a good scientific paper, what are the norms of ethical behaviour in science (including the dangers and pitfalls of plagiarism), and technical tutoring on communicating scientific results through graphics. One aspect of this collection of papers is the apparent redundancy or overlap between the chapters: such redundancy is unavoidable, since each lecturer's approach is from a different viewpoint: editor, referee, author, and publisher.

Part 1 (EAS 49)

This Volume contains a set of seven lectures that deal with diverse aspects related to scientific writing, *viz.*,

- the history and operations of the journal *Astronomy & Astrophysics*,
- the A&A Editors' views of the publishing process,
- the role of the Publisher,
- two chapters on language editing,
- one chapter on library services in astronomy, and
- one paper explaining the use of databases – in particular *VizieR* and *SIMBAD* – in the context of preparing scientific papers.

The first three papers of this Volume are presented by Editors – past and present – of A&A. The first paper starts with a brief historical introduction, followed by a review of the scope, editorial process, and production organization of A&A, including the economic model of the Journal, and some current issues in scientific publishing. This paper is immediately followed by a paper on the history of A&A, by one of the first Editors-in-Chief of the Journal. Then follows a chapter that explains the functioning of scientific journals from the editorial side of the process, with emphasis on the interaction between the three parties: the author(s), the Editors, and the referees. The chapter explains how this proceeds, and discusses editorial criteria – scientific, archival, and ethical – and how these have evolved historically and consensually.

Then follows a paper on the role of the Publisher, describing the various facets of the publishing activity, including the daily work of a dedicated

¹<http://www.eas-journal.org/>

team of professionals that guarantees the timely production of this weekly astronomy journal.

Two articles deal with language editing: the first reviews the general advantages of editing the English expression, and describes both the aims of this effort and its place in the full publication process. That paper is followed by a detailed *Guide* to language editing that serves as a reference for any non-native user of the English language.²

The remainder of the Volume is dedicated to technical support in the broadest sense, *viz.*, to astronomy libraries as providers of information, and to databases at the *Centre de Données astronomiques de Strasbourg* (CDS). Special attention is given to the two most important information tools in astronomy: the *NASA Astrophysics Data System* (ADS) and the *arXiv* e-print server, in addition to an introduction to bibliometric studies. The last paper presents the succession of processes leading published data to the CDS databases, and focusses on the strategy that ensures a high level of quality.

Part 2 (EAS 50)

Whereas Part 1 carries guidelines and examples for publishing in academic journals, the three papers in the second Volume are aimed at supplying guidelines to PhD students and postdoctoral fellows to help them compose scientific papers for different forums (journals, proceedings, thesis manuscripts, etc.). These papers cover the information that was presented in about 9 to 10 lectures in both SWYA Schools, and include several examples and case studies in astronomical context, in addition to many examples from scientific enquiry in a much broader sense.

The first paper copes with the preparation of manuscripts, with the handling of copyrights and permissions to reproduce, with communicating with editors and referees, and with avoiding common errors. More than two dozen FAQs (on authorship, on refereeing, on revising multi-authored papers, etc.) are answered.

The second paper is entirely dedicated to communication with graphics, *i.e.*, to all facets of visual communication by way of images, graphs, diagrams and tabular material. Design types of graphs are explicated, as well as the major components of graphical images. The basic features of computer graphics are explained, and also concepts of color models and of color spaces (with emphasis on color graphics for viewers suffering from color-vision deficiencies). Special attention is given to the verity of graphical content, and to misrepresentations and errors in graphics and in associated basic statistics. Dangers of dot joining and curve fitting are discussed, with

²The full guide is available at
<http://www.aanda.org/images/stories/doc/english-guide.pdf>



Figure 1. Students and lecturers of the first SWYA School (2008), in front of St Rochus church in Blankenberge (Belgium). Photo courtesy Taavi Tuvikene.

emphasis on the perception of linearity, the issue of nonsense correlations, and the handling of outliers. The remainder of the chapter illustrates the distinction between data, fits and models.

The main theme of the third paper is truthful communication of scientific results, and hinges on the pillar that every scientist daily comes across: **ethics** – involving two major aspects of research, *viz.*, the measurement of scientific value, and the enforcement of proper conduct in research and in scientific writing. Scientific misconduct in the broadest sense is discussed by category: researcher misconduct, author misconduct, referee and grant-reviewer misconduct. But also publisher misconduct, editorial misconduct and mismanagement, and research supervisor misbehavior are dealt with. The overall signatures of scientific misconduct are focussed on, as well as the causes and the cures. This is followed by a Section devoted to whistle-blowing.

5. The scope and the future of the SWYA teachings

It is not evident to assess whether SWYA has reached its goals, but several students provided useful feedback that will be helpful for improving our performance when the time comes. The following points were taken from the feedback from a poll that was organised by EDP at the end of SWYA 2009:

- we received a “beyond curtain” look on publishing, from a different position than from the author’s viewpoint;
- to learn how a paper is refereed explains the time needed to publish a paper;
- we learned a lot about the editorial process of A&A and other main journals;
- we learned how to structure a scientific paper;
- the sessions on databases and library services were excellent, and very useful;
- the session on language editing was very useful for non-native English speakers;
- the session on bibliometrics was very valuable;
- the information about graphics was very practical;
- several lectures enabled us to immediately use the knowledge acquired;
- the school was informative, beneficial, friendly, and pleasant in many points, and
- the school was a place for exchange and learning, and should carry on.

So it seems that many students found the initiative informative, useful, encouraging, and adviceful. The answers confirm what was evident to every lecturer: our youngest students seem not to know the difference between

the Editor and the Publisher, they are ill-informed about the role of the referee, they have no clue about the work done by many invisible people in the process of verifying their work and in bringing their manuscripts to print, and many even think that we can do without Editors and Publishers altogether. The answers make it clear that SWYA was very helpful in remediating this lack of knowledge.

Some students also indicated that they found these 2.5-day schools too short, others desired more practical instruction on typesetting with \LaTeX , or a more intensive teaching of the English language. Obviously, these calls for more intensified training can only be met in dedicated language classes and via technical training courses, which fall beyond the scope for which SWYA was originally set up.

Several students also expressed that SWYA taught them some unanticipated elements of scientific education, what led some of them to share their hopes and concerns with the lecturers (either during the sessions, or via private contacts later on).

Another very strong feedback signal consisted of the numerous expressions of appreciation for the very open and positive social atmosphere that prevailed throughout the duration of each school. Because of the fact that we basically had the hotel all to ourselves, this environment led to many discussions among participants (and lecturers), and intense exchanges of writing and research experience before and after the lessons, as well as over dinner, or during an evening stroll on shore. Such freewheeling exchanges of ideas was most beneficial to the students, and to the lecturers. It thus seems that we made the right choice in bringing together very young PhD students in a non-competitive ambiance so different from the workshop and conference atmosphere that some of them already had experienced.

Whether there will be future SWYA Schools depends, above all, on the availability of sponsoring capacity: whether or not this kind of schooling will continue in this format, entirely depends on the initiative of the main sponsor *EDP Sciences*. Nevertheless, the petition to go on with the SWYA project was very heartwarming.

Although the SWYA project was conceived for young astronomers, the School reaches much further than just the young astronomy student, as many general issues related to technical, scientific, and social aspects of scientific writing were addressed. The Proceedings, in particular, are meant for a much wider audience that includes graduate and seasoned students, as well as postdoctoral fellows and thesis supervisors in about any discipline of the exact sciences. The elaborate discussions on bibliometry also widen the readership to scientometrists and science administrators.

Acknowledgements

I am thankful to Uta Grothkopf for very constructive and encouraging comments on a first draft of the manuscript of this paper.

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³<http://www.aspbbooks.org/publications/349-0435.pdf>

⁴<http://www.aspbbooks.org/publications/349-0445.pdf>