

Preface

The *Astronomy & Astrophysics* (A&A) Board of Directors and EDP Sciences, the Publisher of A&A, decided in 2007 to organize a School on the various aspects of scientific writing and publishing, with two aims: (a) to teach young PhD students how to express their scientific thoughts and results through adequate and efficient written communication, and (b) to discuss the operation of A&A as an example of an international peer-reviewed journal in astronomy. To this end, a first *Scientific Writing for Young Astronomers* (SWYA) School was 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.

This book, together with Volume 49 of the EAS Publications Series, is the outcome of these Schools. Whereas Volume 49 presents guidelines and examples for publishing in academic journals (like A&A), the three papers in this 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 address the writing process, graphics, ethics, and bibliometry, and cover the information that was presented in about a dozen lectures. These chapters feature several examples and case studies in astronomical context, in addition to many examples from scientific enquiry in a broader sense – even from art and from business life.

Paper I 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.

Paper II 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, as well as 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 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 Paper III 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. The following bibliometric parameters are explained: the journal impact factor, the journal cited half-life, and the journal immediacy index, as well as paper counts, citation rates, citation index and the Hirsch index. These bibliometric indices and indicators are illustrated with real examples derived from bibliometric analyses of the astronomical literature. The biases of bibliometric indices, and the use and abuse of bibliometrics are worked out. Moreover, suggestions for remedying the present system of bibliometric measurement and evaluation are made. 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 whistleblowing. This chapter illustrates the complex endeavor that education in science really is, and also comprises passages that directly deal with the hopes and concerns of our students, either expressed during and after the lectures, or through private contacts later on.

The best way to use this book is to read it twice: a first reading for skimming its content, and then a deeper reading of the passages that are relevant to what the reader wants to know. Or use this book as a reference, and read the Sections corresponding to items listed in the index or in the expanded Table of Contents.

The opinions expressed in these papers are those of the author, and those of the authors of the cited papers, and do not necessarily reflect the views of the Editors of A&A. None of these papers were submitted for language editing to a professional language editor.

The Schools took place in Hotel and Conference Center Aazaert in the city of Blankenberge on the North Sea coast of Belgium. The meetings were very rewarding, and happened in a very pleasant atmosphere, thanks to the dedication and professionalism of the complete staff: from the barkeeper to the waiters, and from the administrative staff to the chefs in the kitchen – they all contributed greatly in making us feel at home, and in giving us an unforgettable time. In the name of all participants, I express deep appreciation to Mr. Peter Kamoen, Manager of Hotel Aazaert, and to his entire staff.

The Manager of the Schools (on behalf of EDP) was Mrs. Isabelle Turpin, assisted by Mrs. Aurélie Chastaingt. They did a professional job preparing each event, and their presence during the complete duration of each School was a blessing for anyone who needed help. In the name of all lecturers and students, I extend a warm thanks to Isabelle and to Aurélie.

Dr. Agnès Henri, Mrs. Sophie Hosotte, Mrs. Isabelle Houlbert and Mrs. Marie-Louise Chaix (EDP) are given thanks for their most adequate communication and helpful support during the preparation of this book.

My special thanks go to those students who – either during or after the lectures, or through subsequent private contacts – shared with me their hopes and concerns.

I am very much indebted to Dr. Hilmar W. Duerbeck, Dr. Chris Koen, and Dr. Laszlo Szabados for deep proofreading of, and criticism, discussion and advice on the three papers included in this book.

I acknowledge financial support from the Vrije Universiteit Brussel, and I express gratitude to my Employer, the Belgian Fund for Scientific Research (FWO), for supporting several research projects that, over the years, gave me the opportunity to acquire the specialized knowledge presented in this book.

Christiaan Sterken
Editor
University of Brussels, Belgium