

THE HANDS-ON GUIDE FOR SCIENCE COMMUNICATORS

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A STEP-BY-STEP APPROACH TO PUBLIC OUTREACH

LARS LINDBERG CHRISTENSEN

ILLUSTRATIONS BY MARTIN KORNMESSE

Lars Lindberg Christensen ESA/ST-ECF
NASA/ESA Hubble Space Telescope
Garching 85748, Munich, Germany
lars@eso.org

Cover illustration: Science communication: Bringing the Universe to the attention of others and opening their eyes. The illustration was modeled in 3D in Cinema 4D and post-processed in Photoshop by Martin Kornmesser.

Library of Congress Control Number: 2006932967

ISBN-10: 0-387-26324-1

ISBN-13: 978-0-387-26324-3

Printed on acid-free paper.

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For my father
& mother (*In Memoriam*)

FOREWORD

Astronomy and fundamental research in physics are *a priori* of no practical use at all. Work in these fields is carried out to reveal the beauty of nature, in the spirit of scientific endeavour, to satisfy human curiosity — and because it is great fun! There is no reason to be ashamed of that. After many years a piece of fundamental research may find a practical application — but it's not the main initial driver for it. However, if the general public is to fund fundamental research, the taxpayer must get something back. Communication is essential — not only because of some vague “obligation”, but for the long term benefit of people working in the areas of astronomy, spaceflight and physics. So long as the general public is interested in these areas of research they will accept the need to pay for it.

Easy, right? Well, at least in theory. Unfortunately, there are many players out there who obviously haven't got the message. Many institutions, agencies, observatories, laboratories and scientists believe that they communicate, but, actually, they don't. Some of the world's leading observatories only publish a few print-ready pictures per year. Some space agencies operate spacecraft that are virtually unknown to everyone except the most curious enthusiasts for years. Unbelievable? No, just two examples of astronomical “communication” today.

On average, scientists and organisations in the US are doing much better in public outreach activities than their European counterparts. Why? It is not only a matter of funding. There is a completely different attitude to science communication in the US. Most scientists, science organisations and funding agencies in the US have realised that active communication is critically important to keep the system running smoothly and effectively.

For those of you still neglecting science communication, there is a ready cure available: this book! Lars Lindberg Christensen presents a handbook with detailed instructions and examples for devising a proper communication strategy for your project or institute. After the publication of this book there is no longer any reason for “We didn't know”-type excuses. If a single scientist or institution follows only ten percent of the advice given in this book, then communication prospects for their respective areas of science will be in much better shape than they are today.

Communicating endeavours in astronomy, spaceflight and physics is both so important and so easy: Great pictures, extreme numbers, issues that fascinate many people. In my view, scientists who still consider their research, projects, instruments etc as private ‘toys’, should be excluded from public funding. Astronomy and spaceflight are door-openers to the world of physics for many people. They attract young people to professional careers in natural sciences or engineering. Apollo created a whole generation of scientists and engineers. If you communicate your science in a proper way, you could do the same for the amazing big science projects of today. It pays to communicate!

A telescope or a detector unveils the secrets of the Universe. This book unveils the Universe of communication, which — unfortunately — is still shrouded in mystery for many scientists. Scientists, you need to read this book!

Dirk H. Lorenzen
Hamburg, 14 April 2006
Senior science reporter for German Public Radio, Author of *Mission: Mars*

PREFACE

This book springs from my own deep well of love for nature and the Universe to which we have been granted a temporary visitor's visa. Without curiosity we humans are poor. Without the ability to pass on our own curiosity for, and knowledge about, the Universe around us, we will never be able to inspire and induce those short, but incredibly rewarding moments of awe in the minds of other people. We live to learn. We live to inspire. Only the sky is the limit!

This book offers hands-on advice concerning some of the most central topics of practical popular science communication. I have often used examples from astronomy¹ and physics, partly because astronomy and related disciplines have some natural advantages for communication (see section 1.3), and partly because such examples are easy to find, for instance on the web.

The book is divided into four parts. The introductory chapters form Part I, *Setting the Scene*. The actual production of communication products is covered in Part II, *The Production Flow*. Some special topics in science communication are discussed in Part III, *Selected Topics*. The final chapters contain conclusions, references, an index, web links and appendices (Part IV, *Finishing Off*). There is also a comprehensive glossary with definitions and explanations of the many terms and concepts used. Glossary words are marked in **bold** in the index.

Many different aspects of practical science communication aimed at the public² are covered in this book, some of general interest and some of a more specialised nature, but all, I feel, with an important role in science communication, although, admittedly, not all are relevant for every communication office.

One obvious omission from the book is the entire field of formal education. Formal education is an odd and unapproachable creature. Although many of the same communication products are used in both informal (free-choice learning) and formal education as in communication to adults (outreach), material for formal education has to be tailored very specifically to the age group in question and to fit into the curriculum. Curricula change relatively often and are also subject to significant geographic and national variations that make the task of generalising difficult. Other books treat education in great detail, such as, for instance, Ortiz-Gil & Martínez (2005) and references therein.

The book also only touches peripherally on the creative process involved in producing good science communication. Talent and an eye for delicate and aesthetic expression cannot be learnt from a guide such as this. The focus in this text is much more on the mechanical part of the production, not on that spark of creative genius that brings a communication alive.

The material in this book is aimed at full-time science communicators working in communication offices in scientific institutions (the public information officers, abbreviated PIOs), scientists, decision-makers, journalists, teachers, science amateurs and others with an interest in science communication.

1 The term astronomy is broadly used here for "everything that has to do with space", ie space science, human spaceflight, Earth observation and related disciplines.

2 Public science communication is a subset of the wider topic of general science communication that also involves intra-scientist communication. This book deals exclusively with communication aimed at the general public, ie "popular communication". In the following, the word popular or public will be omitted.

Despite the fact that a great many people know something about communication — it is after all an innate human ability — this overview of the more practical aspects of (popular) science communication is appropriate as science communication spans so many different disciplines that no one person can be an expert in them all (the author included). A full appreciation of how to make science communication effective is not easily acquired and it is hoped that new science communicators especially may find this book helpful and inspirational.

Naturally, reading this book alone will not make a good communicator. Good science communication requires a lot of hard work, practice, dedication and talent. Just as the good scientist investigates the laws of nature, or finds an innovative way to send a spacecraft to Mars, so the good science communicator must evaluate how best to communicate scientific results to the target groups within the given framework of his/her organisation.

A wealth of inspiration for this book has been found in excellent resources such as:

- Mitton (2001);
- Finley (2002);
- Madsen & West (2000);
- NASW (2003);
- Maran (2000);
- “The golden volume”, aka. *Astronomy Communication* edited by Heck and Madsen (2003);
- Mahoney (2005-II);
- Robson & Christensen (2005).

I recommend the reader to consult these sources for more ideas and information. I have most certainly overlooked other excellent references, and I would appreciate emails indicating this. I have also tried to be as conscientious as possible with respect to quoting references to other works, but have surely made some inadvertent errors, and would warmly welcome corrections on this point.

This book draws heavily on personal experience, acquired at the European Space Agency’s Hubble Space Telescope office in Munich, Germany. It presents some of the background and the motivation behind the choices made there daily to find the most efficient way of presenting the work of the many talented European Hubble scientists. The author in no way pretends to be an expert in all areas, but rather a jack-of-all-trades, with some knowledge of every branch of science communication. As all science communicators handle the practical aspects of their work in different ways, this book can do no more than present just one view of how to do it. For completeness I would like to mention two other books with similar titles as this Guide, but with rather different, and perhaps complementary, content: Stocklmayer et al. (2001) and Laszlo (2006).

Smaller parts of the material here have appeared in earlier incarnations in Christensen (2005), Christensen (2003) and Nielsen et al. (2006).

Lars Lindberg Christensen (lars@eso.org)
Munich, 31 December 2005

ACKNOWLEDGEMENTS

Many excellent individuals have inspired me over the years. People without whom this book would either not have existed or not have been the same.

First of all I would like to thank those whom I consider to be the *Virtual Dream Team of Science Communication* for inspiration and help. Late at night, after a beer or two, I contemplate gathering this team together one day to make a dream come true: My closest colleague and accomplice, graphical designer *Martin Kornmesser* (Germany), for an always inspiring collaboration. *Anne Rhodes* (UK/Germany), the most efficient and talented proof reader and editor I know. *Robert Hill* (UK), *Michael J. D. Linden-Vørnle* (Denmark) and *Robert Hurt* (USA), the sharpest, craziest discussion partners in existence and source of the most incredible inspiration. My Advanced Development Team, *Lars Holm Nielsen*, *Kaspar K. Nielsen* and *Teis Johansen* (all from Denmark), top class hard developers who have always given absolute loyalty in excess and thousands and thousands of lines of excellent code in exchange for beer, pizza, and cola. *Manolis Zoulias* (Greece), the hardest worker and incredibly kind at heart. A good portion of this book came into existence in Manolis's residences in Athens and in Milos, sitting under the bougainvillea in the foothills overlooking the sunset over the bay.

I would also like to thank *Bob Fosbury* (UK/Germany), my mentor and boss, for granting me access to the powerhouse of science and communication in Munich. I am grateful to *Piero Benvenuti* (Italy), the former head of the Space Telescope-European Coordinating Facility, for paving the way for ESA/Hubble and for inspiring me to always focus on the ball. *Ray Villard* (USA) and *Cheryl Gundy* (USA) took an awful lot of time out for me in 1999, and passed on much of their experience and knowledge gained from the Hubble communication efforts in the USA. Thanks to *Richard Hook* (UK/Germany) for inspirational image processing.

I am honoured to have been working with you all.

I would also like to thank the following for good discussions and for delivering interesting input: *Kirsten Haagensen* (Denmark), *Steve Maran* (USA), *Doug Isbell* (USA), *Michael Cramer Andersen* (Denmark), *Monica G. Salomone* (Spain), *Sune Nordentoft Lauritsen* (Denmark), *Megan Watzke* (USA), *Brooke A. Paige* (USA), *Laura Miles* (AlphaGalileo, UK), *Anna Roth* (Germany, Hungary), *Birgit Mager* (Germany), *Jay Pasachoff* (USA), *Dirk H. Lorenzen* (Germany) and *Robert Roy Britt* (space.com, USA). I am also grateful to *Karin Nordström Andersen* (Denmark) for her support in the early phase of this work.

I am deeply indebted to several students and interns: Discussions with, and inputs from, *Anna-Lynn Wegener* (Germany, intern at ESO) were valuable for section 5.1.1 and section 14.1. *Lars Holm Nielsen* (Denmark) delivered valuable input for section 14.5. Chapter 21 was written with substantial input from a study group from Roskilde University Centre (Denmark): *Lars Holm Nielsen*, *Nanna Torpe Jørgensen*, *Kim Jantzen* and *Sanne Bjerg*. They conducted part of their studies at ESA/Hubble. Chapter 20 was written with substantial inputs from *Sylvie Wieland* (Germany, intern at ESA/Hubble). *Raquel Yumi Shida* (Brazil) did a great job typesetting the book.

Finally a warm thank-you to my editor *Harry Blom* (the Netherlands/USA) at Springer for believing in this idea and to *André Heck* (France) for opening the door.

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