Preface

Writing for Computer Science is an introduction to doing and describing research. For the most part the book is a discussion of good writing style and effective research strategies, with a focus on the skills required of graduate research students. Some of the material is accepted wisdom, some is controversial, and some are my opinions. The book is intended to be comprehensive; it is broad rather than deep, but, while some readers may be interested in exploring topics further, for most readers this book should be sufficient.

The first edition of this book was almost entirely about writing. The second edition, in response to reader feedback, and in response to issues that arose in my own experiences as an advisor, researcher, and referee, was additionally about research methods. Indeed, the two topics—writing about and doing research—are not clearly separated: it is a small step from asking *how do I write?* to asking *what is it that I write about?*

In this new edition, the third, I've further expanded the material on research methods, as well as refining and extending the guidance on writing. There is a new chapter, on professional communication beyond academia; the chapters on getting started, reading, reviewing, hypotheses, experiments, and statistics have been expanded and reorganized; and there is additional or new material on many topics, including theses, posters, presentations, literature reviews, measurement and variability, evidence, data, and common failings in papers. Every chapter has had some revision, and reader feedback has again been importance in shaping changes. The references have been removed; with so many excellent, up-to-date reading lists available at the click of a search button, a static list seemed anachronistic. The example slides have been dropped too; there are limits to the advice that can be given on dynamic visual presentations in a printed textbook.

As in the earlier editions, the guidance on writing focuses on research, but is intended to be broadly applicable to general technical and professional communication. Likewise, the guidance on the practice of research has wider lessons; for example, a practitioner trying a new algorithm or explaining to colleagues why one solution is preferable to another should be confident that the arguments are built on robust foundations. And, while this edition has a stronger emphasis on the doing of

research than did the first two, no topic has been removed; there is additional material on research, but the guidance on writing has not been taken away. I can no longer describe the book as brief, however!

Since the first edition appeared, there have been many changes in the culture of research, and these continue to develop. Physical paper is slowly vanishing as a publication medium, and traditional publishers are being challenged by a range of open-access models. Academic technical reports, already rare a decade ago, have more or less vanished, while online preprint archives have become a key part of the research ecosystem. It now seems to be rare that a spoken presentation is truly unprofessional, whereas in the 1990s many talks were unendurably awful. The growth in the use of good tools for presentations has been a key factor in this change.

Some cultural changes are less positive. A decade ago, I reported that many talks did not have a clear message and were merely a compilation of clever visuals, and that a well-described algorithm had become a welcome, rare exception; both these trends have persisted. Also, while the globalization of English has brought unquestionable benefits to international communication and collaboration, it means that today many papers are written, refereed, and published without passing through the hands of someone who is skilled in the language, so that even experienced researchers occasionally produce work that is far too hard to understand. The Web provides easy access to literature, but perhaps the necessity of using a library imposed a discipline that is now lacking, as past work appears to be increasingly neglected. Some issues concern the integrity of the scientific enterprise itself, such as the growing number of venues that publish work that doesn't meet even the most rudimentary standards.

The perspectives of all scientists are shaped by the research environments in which they work. My research has involved some theoretical studies, but the bulk of my work has been experimental. I appreciate theoretical work for its elegance, yet find it sterile when it is too detached from practical value. While experimental work can be ad hoc, it can also be deeply satisfying, with the rewards of probing the space of possible algorithms and producing technology that can be applied to the things we do in practice. My perspective on research comes from this background, as does the use of experimental work as examples in this book (an approach that is also justified by the fact that such work is generally easier to outline than is a theoretical contribution). But that doesn't mean that my opinions are simply private biases. They are—I hope!—the considered views of a scientist with experience of different kinds of research.

For this new edition, William Webber and Anthony Wirth redrafted some sections, wrote new text, and helped guide the revisions in areas where I am inexpert; I am particularly grateful for their contributions to the chapters on mathematics, algorithms, experiments, and statistics. These sections now represent a consolidation of views, though I have retained the use of *I* and *my* rather than *we* and *our*. Both William and Tony are long-term colleagues; I've appreciated testing my views against theirs, and I think this book is stronger for it. Another new contributor is

Richard Zanibbi, whose suggestions for additional exercises I have gratefully incorporated.

Many other people helped with this book in one way or another. For the first edition, special thanks are due to Alistair Moffat, who contributed to the chapters on figures, algorithms, editing, writing up, and reviewing. Another notable collaborator has been Paul Gruba, my co-author on our two texts on thesis writing skills, *How To Write A Better Thesis* and its prequel, *How To Write A Better Minor Thesis*. With feedback from friends, colleagues, and readers for over 20 years, the list of people who have influenced this book is large; particular thanks are due to Philip Dart, Gill Dobbie, Michael Fuller, Evan Harris, Ian Shelley, Milad Shokouhi, Saiad Tagaghoghi, James Thom, Rodney Topor, and Hugh Williams. I also thank my research students; the hundreds of students who have participated in my research methods lectures; and the many readers who pointed out mistakes or made helpful suggestions.

Many thanks are due to my editor for the second and third editions, Beverley Ford, for her patience during the procrastination, prevarication, and prevalent preponderance of passivity that led to the long delay between editions. Thanks also to the Springer staff who worked on the final editing and production, in particular James Robinson. And, finally, thanks to my partner, Carolyn, for well lots of stuff.

Melbourne, Australia, September 2014   Justin Zobel

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