

# PREFACE

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“Nowadays,” complained the American statistician William K. B. V. Kruskal more than four decades ago, “writers calling themselves statisticians and those calling themselves philosophers of science often refer to each [other], but [their] communication is restricted and piecemeal.”<sup>1</sup> This volume aims to remedy these shortcomings which, unfortunately, have continued to plague the disciplines. It provides state-of-the-art research in the area of Philosophy of Statistics by encouraging numerous experts to communicate with one another without feeling “restricted” by their disciplines or thinking “piecemeal” in their treatment of issues. A second goal of this book is to present work in the field without bias toward any particular statistical paradigm.

Broadly speaking, the essays in this *Handbook* are concerned with problems of induction, statistics and probability. For centuries, foundational problems like induction have been among philosophers’ favorite topics; recently, however, non-philosophers have increasingly taken a keen interest in these issues. This volume accordingly contains papers by both philosophers and non-philosophers, including scholars from eight academic disciplines. In addition, while the *Handbook* deals primarily with Anglo-American analyses and data, it also includes various approaches by many non-Western authors. The contributors hail from more than ten countries spread over four continents, providing the volume with a valuable global dimension. Statistics, of course, affect virtually every aspect of human life everywhere, from Spain to China to Mauritius. Appreciating the power of statistics, many of the authors have utilized data far from their places of origin, and, to the book’s benefit, they are not hesitant to exploit this information to present their own interpretations of complex issues. Moreover, just as statistics has a theoretical side, so it also has an applied side. Several chapters in this volume have combined those two aspects. Additionally, we provide essays that are straight-forwardly historical and address both western and non-western views on probability, thus making available ramifications of statistics and probability in different cultures.

A few words are in order regarding our volume and the kind of assistance of other scholars. We relied on an international team of experts in preparing the papers offered here. The referees were extremely generous with their time, advice and suggestions. James Hawthorne did far more than his share of reading and offering valuable suggestions. Clark Glymour, Theodore Porter, Jeff Paris, Antony Eagle, David Hitchcock, Prabal K. Sen, Jose Miguel Ponciano, Mylavaram Deekshithulu,

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<sup>1</sup>W. Kruskal and J. Tanur, eds. *International Encyclopedia of Statistics*, Vol. 2, Free Press, Collier Macmillan Publishers, London, 1968, p.1082.

Jay Herson, Bijoy Mukherjee, and Oliver Schulte also deserve high praise. Without the help of these scholars, the *Handbook* would not have taken its present shape with such variety, complexity, depth and scope.

While writing and revising the Introduction, we received valuable help from the essays' authors regarding whether we correctly represented their views. Our drafts were shuttled back and forth between the authors and the editors until both were satisfied. The process enabled us to clarify our comments on their essays. We believe this makes the Introduction more representative of how both the authors and we the editors understand the contributors' arguments and contributions.

Although our *Handbook* is substantial in terms of its variety, scope, complexity, and depth, it is not designed to provide an all-encompassing Encyclopedia of Statistics. We were unable to include some significant topics like experimental designs, the identifiability problem in statistics, bootstrapping, and cross-validation. We hope that the readers will still find it useful and significant in terms of its contribution to numerous fields which apply and use statistics in a reflective manner.

The question remains whether scholars have been able to communicate more effectively across disciplinary divides since the publication of Kruskal's paper four decades ago. Some scholars have mixed views about the merit of this sort of interaction. One foremost philosopher of science noted that compared to twenty-five years ago, today's philosopher of science are considerably more dependent on knowing much more of the actual science. By implication, modern philosophy of science should be interdisciplinary, and that is good for the well-being of the subject. A statistician of great eminence, however, holds a different opinion about the interaction between statisticians and philosophers. Based on his experience, he notes that when statisticians and philosophers meet, they diverge like two logs floating in a river,<sup>2</sup> touching one another solely for the purpose of taking two different routes.<sup>3</sup> What are we to make of these conflicting perspectives among experts? Ultimately, we leave it to the reader to evaluate whether this volume is able to make some headway in the direction of multi-disciplinary dialogue, and whether this dialogue is worthwhile for the well-being of these overlapping disciplines. However, we firmly believe that the effort at cross-disciplinary communication is a worthwhile endeavor.

It would be inappropriate to conclude the preface without recording our thanks to the people who were involved from its very inception. It would be more than an understatement if we claimed to be able to produce a volume of this size had we not leaned on many individuals for guidance and help. We thank John Woods, the series editor, for his guidance and suggestions. We are especially grateful to Jane Spurr who worked tirelessly toward the completion of this volume and responded patiently to our daily emails. At times, we began to feel the despair noted by

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<sup>2</sup>This log analogy has been borrowed from the *Ramayana* (the "Ayodhya Section"), one of the epics of the Indian sub-continent.

<sup>3</sup>However, he does not like to sound so pessimistic. This came out more as his reaction to his experience of the present state of interactions between these two disciplines rather than what he believes theoretically possible about a better interaction between philosophy of science and statistics.

Woody Allen: “eternity is very long, especially towards the end.”<sup>4</sup> During those trying times, Jane reassured us that the task was almost completed. We are truly indebted to her for both her ceaseless work and her dedication to the production of this volume.

We also thank both A. Philip Dawid, Jayanta K. Ghosh, and Colin Howson for their suggestions regarding the volume, as well as our colleagues and friends for their support, including James Allard, Anindya Bandyopadhyay, John G. Bennett, Gordon Brittan, David Cherry, Steve Cherry, Abhijit Dasgupta, Dan Flory, Sanford Levy, Michelle Maskiell, Sue Monahan, Mujib Rahman, Michael Reidy, Abdur Razzaque, Tasneem Sattar, Billy Smith and Mark Taper. PSB also acknowledges the help of his department’s two superb administrative assistants, Diane Cattrell and Deidre Manry, for their smiling faces whenever he needed long printouts for the volume. PSB is also thankful to the Montana State University’s legal team for its expert opinion in spelling out some features of the contract. Last but not least, the generous support received by PSB from the Astrobiology Biogeocatalysis Research Center (*NASA* grant #4w1781) and a 2007 summer grant from Montana State University’s Vice-Provost Office assisted him in carrying out this research. MRF thanks the University of Wisconsin-Madison and the University of Pittsburgh Center for the Philosophy of Science for their support during the spring semester of 2006.

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<sup>4</sup>Quoted in Martin Rees’ *Just Six Numbers: The Deep Forces that Shape the Universe*. Basic Books, Great Britain, 2000, p.71.