

## Foreword

The impact of global warming and climate change is obvious and can be seen everywhere and anytime. It has changed our daily lives tremendously and costs billions of dollars and many lives every year. For example, natural disasters such as hurricanes and drought happen much more often now. Global warming is caused by many factors from nature and humans. Part of global warming is caused by computers, both hardware and software computing. According to Gartner, a market research company, the global information technology industry generated as much greenhouse gas—about 2% of global CO<sub>2</sub> emissions—as the world's airlines in 2008. As computers are becoming cheaper and more popular, it is foreseen that computers will play a bigger role in the future global warming. Asking people not to use computers or to spend less time on computers is not realistic. One way to mitigate the impact of computers on environment is by applying green computing.

In the past, the amount of energy and resource consumption by computers was significantly ignored. For example, it was common in the past, even today, that office computers were left on overnight. Therefore, simple green-computing methods could be easily deployed and be widely applied to computers and applications such as device/component/computer recycling and power-saving mode. On the other hand, green computing could be complicated and be more effective by using advanced methods such as efficient algorithms and smart scheduling. A book is not able to cover every detail of green computing. This book focuses on two themes: (1) sustainable ICTs (Information and Communication Technologies) and (2) sustainable management systems. ICTs involve the technologies to process information and facilitate communications and management systems including most business systems. These two themes cover a great part of computing and green ICTs, and management systems will substantially reduce the energy and resource consumption.

Today's computer designers and developers must have a green-computing mindset to approach their problems. It is not only for Mother Nature, but also for the trend of computing. Desktop computing no longer dominates the computing methods. Mobile/handheld/smartphone computing is getting extremely popular these days and this kind of computing does not have the luxury of consuming much power. This book, *Sustainable ICTs and Management Systems for Green Computing*, is a timely and urgently needed publication. It provides the most-up-to-date, crucial, and practical information for green computing. Readers learn advanced green-computing knowledge from this book and are able to apply the proposed methods to real-world problems. It is a must-read book for IT students, researchers, scholars, and workers with green computing in mind.

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**Ruay-Shiung Chang** received his B.S.E.E. degree from National Taiwan University in 1980 and his Ph.D. degree in Computer Science from National Tsing Hua University in 1988. After graduation, he worked for Chung Shan Institute of Science and Technology and National Taiwan University of Science and Technology. He is now a Vice-President of National Dong Hwa University and a Professor in the Department of Computer Science and Information Engineering. His research interests include Internet, wireless networks, RFID, and cloud computing. He has published more than 70 peer-reviewed journal papers and numerous international conference papers. He is an editor for *International Journal of Internet Protocol Technology*, *Journal of Internet Technology*, and *Journal of Convergence Information Technology*. Dr. Chang is a member of ACM, a senior member of IEEE, and a founding member of Taiwan Institute of Information and Computing Machinery. Dr. Chang also served on the advisory council for the Public Interest Registry ([www.pir.org](http://www.pir.org)) from 2004 to 2007. In 2009, Dr. Chang received the Outstanding Information Technology Elite Award from the ROC Information Month Committee.