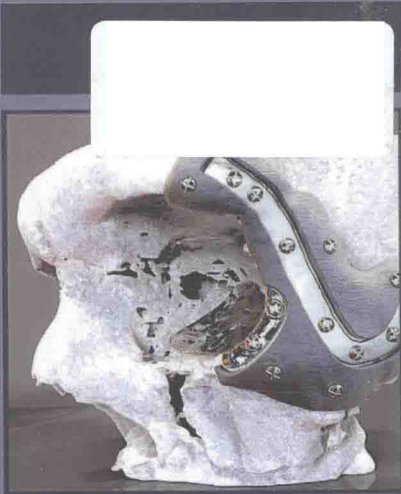


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Medical Modelling

The Application of Advanced
Design and Rapid Prototyping
Techniques in Medicine

Second Edition

Richard Bibb, Dominic Eggbeer
and Abby Paterson

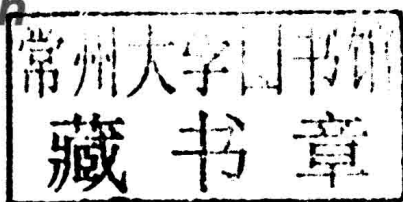
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Abby Paterson***



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Preface

The principal aim of this book is to provide a genuinely useful text that can help professionals from a broad range of disciplines to understand how advanced product design and development technologies, techniques and methods can be employed in a variety of medical applications. The book describes the technologies; methods and potential complexities of these activities as well as suggesting solutions to some of the commonly encountered problems and highlighting potential benefits. This book is based on the collective experience of the authors spanning 20 years of research and practice in medical applications. The majority of the research has been conducted through the activities of the Surgical & Prosthetic Design team of PDR and Loughborough University's Design School through collaboration with clinical, academic and industrial partners.

The book is presented in two main sections. In the first section, the technical chapters provide an introduction to the various technologies involved ranging from medical scanning to physical model manufacture. The second section provides a number of interesting and varied case studies that collectively cover the application of most, if not all, of the technologies introduced in the previous chapters. To ensure that these case studies are relevant and appropriate they have been drawn from work previously published in internationally peer-reviewed journals or conference proceedings with full acknowledgement, proper citation and permission where appropriate. Where appropriate these papers have been updated to reflect recent technological advances.

This text also aims to encourage what is, by its very nature, a multidisciplinary and collaborative field. The case studies selected reflect this by describing a broad range of techniques and applications. Although much work has been done in this area, there is a tendency for people to publish in the journals, language and context of their own professional practice. Whilst this text does not purport to be the most comprehensive review of the work done to date, it is a conscious effort to overcome these professional interfaces and encourage multidisciplinary collaboration by providing a single source of useful reference material accessible to readers from any relevant background.

Therefore it is hoped that this book will appeal equally to medical and technical specialties, including for example: designers, biomedical engineers, clinical engineers, rehabilitation engineers, medical physicists, radiologists, radiographers, surgeons, prosthetists, orthotists, orthodontists, anatomists, medical artists and anthropologists, and perhaps even veterinarians, archaeologists and palaeontologists.

The text will also provide an excellent resource for postgraduate students, researchers and doctoral candidates working in this rapidly developing, important and exciting area.

Richard Bibb
Loughborough

Acknowledgements

This book would not have been possible without the help and support of many people. It is appropriate therefore to offer our thanks to our colleagues at PDR (Cardiff Metropolitan University) and Loughborough University for their assistance and support. We would like to thank Prof. Robert Brown and Prof. Alan Lewis for providing the Surgical and Prosthetic Design Group at PDR with the support needed to establish and grow the group.

As the central theme underpinning this book is multidisciplinary collaboration, it is important to recognise the input of all who have contributed to it. We thank all of our collaborators and co-authors without whom none of the work reported in this book would have been possible. Each case study is fully acknowledged and we would also like to thank the various publishers for their kind permission to reproduce our previous papers and articles.

We have been fortunate enough to establish a number of significant and long-term partnerships and we would like to offer our particular thanks to the following. Professor Robert Williams for his enthusiasm and collaboration in dental technology; Professor Stephen Richmond and his colleagues at Cardiff Dental School, for their collaboration in imaging and orthodontic applications; Lucia Ramsey and Ella Donnison for their contribution to orthotics research; Dr John Winder for his collaboration on medical modelling and imaging and Prof. Julian Minns for his collaboration on orthopaedic applications. We would also like to thank all those involved in CARTIS, especially Adrian Sugar, Alan Bocca and Peter Evans from Morriston Hospital who did so much to help establish research in advanced technologies in head and neck reconstruction.

We would like to thank Sean Peel for the computer rendering used for the cover image.

Finally, we would also like to thank everyone at Woodhead/Elsevier for all their help and professional expertise in turning our manuscript into the book you see here.

Richard Bibb, Dominic Eggbeer and Abby Paterson

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