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David Thomas, Department of Biochemistry, University of Minnesota Medical School, Minneapolis, MN, USA

Kiao Inthavong · Narinder Singh ·  
Eugene Wong · Jiyuan Tu  
Editors

# Clinical and Biomedical Engineering in the Human Nose

A Computational Fluid Dynamics Approach

 Springer

*Editors*

Kiao Inthavong  
Mechanical and Automotive Engineering  
School of Engineering  
RMIT University  
Bundoora, VIC, Australia

Narinder Singh  
Sydney Medical School  
University of Sydney  
Sydney, NSW, Australia

Eugene Wong  
Mechanical and Automotive Engineering  
School of Engineering  
RMIT University  
Bundoora, VIC, Australia

Jiyuan Tu  
Mechanical and Automotive Engineering  
School of Engineering  
RMIT University  
Bundoora, VIC, Australia

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# Preface

In recent years, there has been an explosion in interest in the field of Computational Fluid Dynamics (CFD) of the Nose and Airway. Historically, this period of growth can be traced back to the early 1990s when rapid developments in computing technology occurred. Researchers began exploring the use of CFD in the nose and airway, firstly by modelling airflow patterns, calculating changes in temperature and pressure, and measuring wall shear stress. Next, researchers studied common abnormalities, such as septal deviation, septal perforations, and inferior turbinate hypertrophy. Recently, CFD has been used to model and predict the effects of surgery and therapeutic interventions.

It was evident that the growth in computational capability and uptake of CFD technology in clinical applications was gaining significant traction. The international Society for CFD Of the Nose and Airway (SCONA, [www.scona.org](http://www.scona.org)) held its inaugural world scientific congress in London, UK, in 2018. This brought together leading CFD clinicians and engineers with the aim of fostering collaboration and collegiality, increasing the impact of the work being performed and exploring the technology's significant potential to reveal the biomechanics of nasal physiology. In 2019, the second SCONA world scientific congress was held in Chicago, USA, bringing CFD's insights to a newer and larger audience.

The meetings demonstrated a strong need to bridge the gap between engineering knowledge and clinical experience, culminating in the creation of this book. In the spirit of SCONA—to bring the diverse mix of expertise together—a call out for contributions to this text was made to SCONA participants and members. The feedback and enthusiasm from all contributors made the editorial process a wonderful experience and the book was a pleasure to compile.

Our goal for this book was to showcase the wide variety of work being undertaken worldwide in this field and to provide foundational knowledge to fill the gaps that students entering this field may encounter. We sincerely thank all the

authors for their fascinating and insightful contributions in creating this state-of-the-art work. To you, the reader of this book, we trust that the experience and innovation contained within each chapter will inspire new research ideas and effective clinical outcomes.

Bundoora, VIC, Australia

Kiao Inthavong  
Narinder Singh  
Eugene Wong  
Jiyuan Tu

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We are also grateful for the research grant from Garnett Passe Rodney Williams Memorial Foundation (Conjoint Grant 2019), which supported the collaborative efforts of clinicians and engineers to compile this book and to make progress in research towards improving clinical practise of otolaryngology, head, and neck surgery (OHNS).

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# Contributors

**Jim Bartley** University of Auckland, Auckland, New Zealand

**Alister J. Bates** Cincinnati Children's Hospital, Cincinnati, USA

**Kimberley Bradshaw** University of Sydney, Sydney, Australia

**Hadrien Calmet** Barcelona Supercomputing Center, Barcelona, Spain

**Jose Luis Cercos-Pita** Postdoctoral researcher, Department of Surgical Sciences, Hedenstierna laboratory, Uppsala Universitet, Uppsala, Sweden

**Richard Douglas** University of Auckland, Auckland, New Zealand

**Yu Feng** Oklahoma State University, Stillwater, USA

**Dennis Onyeka Frank-Ito** Duke University, Durham, NC, USA

**Guilherme Garcia** Medical College of Wisconsin, Wauwatosa, WI, USA

**Koch Gerda** AIT Angewandte Informationstechnik Forschungsgesellschaft mbH, Graz, Austria

**Hamideh Hayati** Oklahoma State University, Stillwater, USA

**Kiao Inthavong** Mechanical & Automotive Engineering, School of Engineering, RMIT University, Melbourne, Australia

**Chengyu Li** Villanova University, Villanova, USA

**Andreas Lintermann** Forschungszentrum Jülich GmbH, Jülich, Germany

**Lehner Matthias** AIT Angewandte Informationstechnik Forschungsgesellschaft mbH, Graz, Austria

**Benda Odo** AIT Angewandte Informationstechnik Forschungsgesellschaft mbH, Graz, Austria



**Ortiz Ramiro** AIT Angewandte Informationstechnik Forschungsgesellschaft mbH, Graz, Austria

**Hana Salati** Auckland University of Technology, Auckland, New Zealand

**Yidan Shang** RMIT University, Melbourne, Australia

**Kendra Shrestha** RMIT University, Melbourne, Australia

**Dennis Shusterman** University of California, San Francisco, USA

**Narinder Singh** University of Sydney, Sydney, Australia

**Joey Siu** University of Auckland, Auckland, New Zealand

**Jiyuan Tu** RMIT University, Melbourne, Australia

**Ross Walenga** U.S. Food and Drug Administration, Silver Spring, USA

**Koch Walter** AIT Angewandte Informationstechnik Forschungsgesellschaft mbH, Graz, Austria

**David White** Auckland University of Technology, Auckland, New Zealand

**Eugene Wong** RMIT University, Melbourne, Australia

**Jinxiang Xi** University of Massachusetts Lowell, Lowell, England

**Kai Zhao** Ohio State University, Columbus, USA

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