

| | |
|-------------------------|---|
| 1. Record Nr. | UNINA9910544873003321 |
| Titolo | Biomedical visualisation . Volume 11 // Paul Rea, editor |
| Pubbl/distr/stampa | Cham, Switzerland : , : Springer, , [2022] ©2022 |
| ISBN | 9783030877798 9783030877781 |
| Descrizione fisica | 1 online resource (350 pages) |
| Collana | Advances in experimental medicine and biology ; ; Volume 1356 |
| Disciplina | 610.28 |
| Soggetti | Biomedical engineering Biotechnology Computer vision Enginyeria biomèdica Imatges mèdiques Visualització tridimensional Biotecnologia Llibres electrònics |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di bibliografia | Includes bibliographical references. |
| Nota di contenuto | Intro -- Preface -- Acknowledgements -- About the Book -- Contents -- Editor and Contributors -- 1: Creating Interactive Three-Dimensional Applications to Visualise Novel Stent Grafts That Aid in the Treatment of Aortic An... -- 1.1 Introduction -- 1.2 Background -- 1.2.1 Aortic Aneurysm Background -- 1.2.1.1 Thoracic Aortic Aneurysms -- 1.2.1.2 Abdominal Aortic Aneurysms -- 1.2.2 Surgical Interventions for AAAs and TAAs -- 1.2.2.1 Open Surgical Repair and Endovascular Aneurysm Repair of AAAs -- 1.2.2.2 Open Surgical Repair and Endovascular Aneurysm Repair of TAAs -- 1.2.3 Potential of Medical Visualisations for Surgical Techniques -- 1.2.3.1 Imaging Modalities in a Healthcare Setting -- 1.2.3.2 Public Engagement for Medical Visualisation -- 1.3 Methods -- 1.3.1 Conceptual Development (Storyboard/Outline) -- 1.3.2 Digital 3D Content Production -- 1.3.2.1 Segmentation of the Aorta, Kidneys and Associated Vessels -- 1.3.2.2 |

Bifrost Visual Programming -- 1.3.2.2.1 Voxel Volume Remeshing Using Bifrost Graph Editor -- 1.3.2.3 Retopology and Sculpting -- 1.3.2.4 Modelling of the Heart -- 1.3.2.5 Modelling of Relay Endograft -- 1.3.2.6 Modelling of Fenestrated Anaconda Endograft -- 1.3.2.6.1 Wires and Stitching of Stent Graft -- 1.3.2.6.2 Stitches and Fine Details of Graft -- 1.3.2.6.3 Additional Stent Body Models -- 1.3.2.6.4 Deployment Devices -- 1.3.2.7 Texturing in Substance Painter -- 1.3.2.8 Informational Animations -- 1.3.2.8.1 Animations for the Fenestrated Anaconda Stent Graft -- 1.3.2.8.2 Animations for the Proximal Relay Stent Graft -- 1.3.2.8.3 Red Blood Cell Flow Animations -- 1.3.2.8.4 Post Processing -- 1.3.2.9 Application Development -- 1.3.2.9.1 Home Screen -- 1.3.2.9.2 Features Section -- 1.3.2.9.3 Clinical Performance and Deployment Sections -- 1.4 Results. 1.4.1 Outcomes from Evaluating the Finished Application with Clinical Professionals -- 1.5 Discussion -- 1.5.1 Discussion of Development Process -- 1.5.2 Discussion of Application Feedback -- 1.5.3 Benefits and Drawbacks of the Application/3D Visualisation Technique -- 1.5.4 Limitations -- 1.5.5 Further Development -- 1.6 Conclusion -- References -- 2: Using Confocal Microscopy to Generate an Accurate Vascular Model for Use in Patient Education Animation -- 2.1 Introduction -- 2.2 Blood Pressure -- 2.3 Blood Pressure Regulation -- 2.4 Pathophysiology of Hypertension -- 2.5 Peripheral Resistance Artery Structure and Vascular Remodelling in Hypertension -- 2.6 Treatment of Hypertension -- 2.7 Medication Adherence -- 2.8 Patient Education Can Improve Medication Adherence -- 2.9 Generating Digital 3D Models Using Confocal Microscopy -- 2.10 Building a Complete Vessel 3D Model from a Partial Confocal Microscopy Dataset -- 2.11 Modelling the Tunica Intima -- 2.12 Tunica Media -- 2.13 Tunica Externa -- 2.14 Simple Effects in Animation -- 2.15 Vascular Wall Remodelling Using Blend Shapes -- 2.16 Maya's MASH Toolkit -- 2.17 Materials (Shaders) -- 2.18 Lighting -- 2.19 Rendering -- 2.20 Results -- 2.21 Discussion and Evaluation -- References -- 3: Methods and Applications of 3D Patient-Specific Virtual Reconstructions in Surgery -- 3.1 Introduction -- 3.2 Methods of 3D Virtual Reconstructions -- 3.2.1 Segmentation -- 3.2.1.1 Manual Segmentation -- 3.2.1.2 Algorithmic Approaches to Segmentation -- 3.2.2 Rendering Methods for 3D Virtual Models -- 3.2.2.1 Volumetric Rendering -- 3.2.2.2 Surface Rendering Techniques -- 3.2.3 Post-Processing of Surface Polygon Mesh -- 3.2.3.1 Decimation -- 3.2.3.2 Smoothing -- 3.2.4 Advanced 3D Modelling Techniques -- 3.2.4.1 Complex 3D Modelling and Digital Sculpture -- 3.2.4.2 Retopology -- 3.2.4.3 UV Unwrapping. 3.2.4.4 Texture Maps and Physically Based Rendering -- 3.3 Applications of 3D Models in Surgical Practice -- 3.3.1 3D Models in Surgical Planning -- 3.3.1.1 Anatomical Understanding -- 3.3.1.2 Patient-Specific Simulation -- 3.3.1.3 Resection Planning -- 3.3.1.4 Reconstruction -- 3.3.2 Intraoperative Navigation -- 3.3.3 3D Models in Surgical Patient Education -- 3.4 Conclusion -- References -- 4: Proof of Concept for the Use of Immersive Virtual Reality in Upper Limb Rehabilitation of Multiple Sclerosis Patients -- 4.1 Rationale -- 4.2 Multiple Sclerosis and Conventional Physiotherapy -- 4.3 Virtual Reality-Based Rehabilitation -- 4.3.1 Interaction -- 4.3.2 Visualisation -- 4.3.3 HMDs in MS Rehabilitation -- 4.4 Treatment Adherence and Motivation -- 4.4.1 Feedback -- 4.5 Aims and Objectives -- 4.6 Methods -- 4.6.1 Workflow (Fig. 4.1) -- 4.6.1.1 Materials -- 4.6.2 Design and Development Process -- 4.7 Developmental Outcomes -- 4.7.1 Menu Scene -- 4.7.2 Piano Scene -- 4.7.3 Maze Scene -- 4.7.4 Evaluation -- 4.7.4.1 Participants -- 4.7.4.2 Experimental Set-Up and Procedure -- 4.7.4.3 Ethics -- 4.7.4.4 Data Analysis -- 4.8 Results --

4.9 Discussion -- 4.9.1 Future Works -- 4.10 Conclusion -- References
-- 5: Virtual Wards: A Rapid Adaptation to Clinical Attachments in
MBChB During the COVID-19 Pandemic -- 5.1 Introduction -- 5.2
Theoretical Underpinnings -- 5.2.1 Dual-Process Theory -- 5.2.2 Script
Theory -- 5.2.3 Cognitive Load Theory -- 5.2.4 Situated Cognition --
5.3 Technological Considerations -- 5.3.1 Flexibility of Content --
5.3.2 Inclusion of Automatically Marked Questions -- 5.3.3 Control
over Non-linear Lesson Flow -- 5.3.4 Large Amount of Information in a
Single Click -- 5.3.5 Embedding H5G Interactive Content -- 5.3.6 Tips
for Virtual Ward Developers -- 5.4 Description of the Virtual Wards --
5.4.1 The Content Covered by the Virtual Wards.
5.4.2 The Format of the Modules -- 5.4.3 The Interactive Cases --
5.4.3.1 Setting the Scene -- 5.4.3.2 Interactive History-Taking --
5.4.3.3 Observations and Examination -- 5.4.3.4 Investigations:
Selection and Interpretation -- 5.4.3.5 Refining the Differential --
5.4.3.6 Management -- 5.5 Evaluation and Future -- 5.5.1
Asynchronous Engagement with Virtual Wards -- 5.5.2 Issues Working
with Multiple New Technologies -- 5.5.3 Clinician Time Involved to
Create Content -- 5.5.4 Simultaneous Virtual Wards -- 5.5.5 Quality
Control of Benevolent Contributor Content -- 5.5.6 A Reflection on the
Faculty Experience -- 5.5.7 The Students' Perspective -- 5.5.7.1 The
Virtual Ward Format -- 5.5.7.2 Feedback on Content -- 5.5.7.3 Amount
of Content -- 5.5.7.4 Technical Difficulties -- 5.5.7.5 Loss of Clinical
Contact -- 5.5.8 Lessons Learnt -- 5.6 Tips for Setting Up Virtual
Wards -- 5.7 The Future of Virtual Wards -- References -- 6: Artificial
Intelligence: Innovation to Assist in the Identification of Sono-anatomy
for Ultrasound-Guided Regional Anaesthe... -- 6.1 Introduction -- 6.2
Part 1: Challenges in Ultrasound Image Interpretation and Ultrasound-
Guided Regional Anaesthesia -- 6.2.1 What Is Ultrasound-Guided
Regional Anaesthesia? -- 6.2.2 Why Is Regional Anaesthesia Difficult?
-- 6.2.2.1 Selection of the Right Block -- 6.2.2.2 Acquiring and
Interpreting an Optimised Ultrasound Image -- 6.2.2.2.1 Operator
Dependence -- 6.2.2.2.2 Anatomical Variation -- 6.2.2.2.3 Learning
Materials Depict Ideal Versions of Sono-anatomy -- 6.2.2.2.4
Comorbidity -- 6.2.2.2.5 Inattentional Blindness -- 6.2.2.2.6
Satisfaction of Search -- 6.2.2.2.7 Fatigability -- 6.2.2.3 Planning a
Safe Needle Path and Visualising the Needle Tip -- 6.2.2.4 Ensuring
Accurate Deposition of Local Anaesthetic Around the Target Structure.
6.2.2.5 Post-Procedure Monitoring Both to Ensure Effect and to Monitor
for any Complications -- 6.2.3 Education in Ultrasound-Guided
Regional Anaesthesia -- 6.3 Part 2: An Introduction to Artificial
Intelligence for Clinicians -- 6.3.1 What Is Artificial Intelligence? --
6.3.2 Machine Learning Categories -- 6.3.3 The Computational
Problem -- 6.3.4 Rule-Based vs Model-Based Techniques -- 6.3.4.1
Rule-Based Techniques -- 6.3.4.2 Model-Based Techniques -- 6.3.5
Convolutional Neural Networks -- 6.3.6 The U-Net Architecture --
6.3.7 How Models Train -- 6.3.8 Model Evaluation -- 6.4 Part 3: The
Current State of AI in Ultrasound Image Interpretation for Ultrasound-
Guided Regional Anaesthesia -- 6.4.1 How Can Technology Be Used to
Augment UGRA? -- 6.4.2 Summary of Different Approaches -- 6.4.3
Segmentation -- 6.4.3.1 Deep Learning Approaches -- 6.4.3.2 Non-
deep Learning Approaches -- 6.4.4 Tracking Methods -- 6.4.4.1 How
Does Tracking Fit in with Segmentation? -- 6.4.4.2 Approaches --
6.4.5 Summary and Future Directions -- 6.5 Part 4: A Case Study:
ScanNav Anatomy Peripheral Nerve Block -- 6.6 Part 5: The Future:
Artificial Intelligence and Ultrasound-Guided Regional Anaesthesia --
6.6.1 Supporting Practice -- 6.6.2 Changing How We Learn -- 6.6.3
The Extra Dimension -- 6.6.4 The Future of Clinical Practice --

References -- 7: A Systematic Review of Randomised Control Trials Evaluating the Efficacy and Safety of Open and Endoscopic Carpal Tunnel Re... -- 7.1 Introduction -- 7.1.1 Carpal Tunnel Syndrome -- 7.1.2 The Surgical Interventions -- 7.1.3 Aims and Objectives -- 7.2 Methods -- 7.2.1 Study Identification -- 7.2.2 Study Screening and Selection -- 7.2.3 Assessment of Patient Outcomes -- 7.2.4 Risk of Bias Assessment -- 7.2.5 Data Analysis -- 7.3 Results -- 7.3.1 Study Identification, Screening and Inclusion -- 7.3.2 Study Characteristics. 7.3.3 Patient Outcomes.
