

EXPERT3D

Transversal Programme in Medical Image Postprocess, Training Professionals: 3D Printing to Research

MODULE 1

INTRODUCTION: PRESENT AND FUTURE OF MEDICAL IMAGE APLICATIONS

Week 1: Oct 28 - Nov 3 (Barcelona)
Nov 4 - Nov 10 (Coimbra)

MODULE 2

ANATOMY AND IMAGE TECHNIQUES

Week 2: Nov 4 - Nov 10 (Barcelona)
Nov 11 - Nov 17 (Coimbra)

MODULE 3

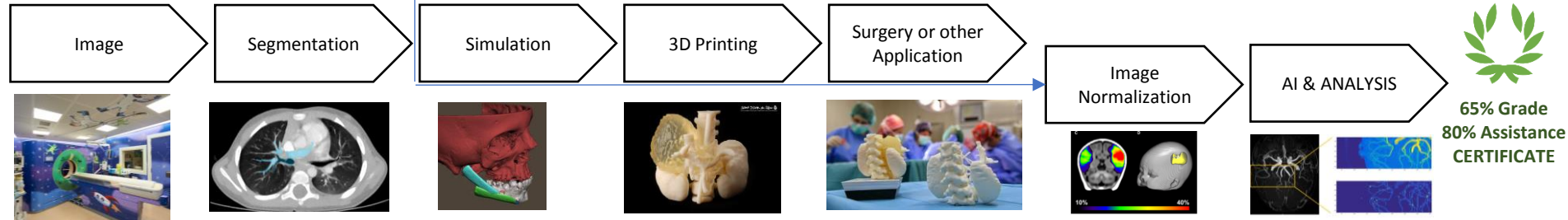
IMAGE POST-PROCESSING AND 3D PRINTING FOR HEALTHCARE APLICATIONS

W3: Nov 11 - Nov 17 (Barcelona)
Nov 18 - Nov 24 (Coimbra)

MODULE 4

FROM IMAGE TO AI AND RESEARCH

W4: Nov 18 - Nov 30 (Barcelona)
Nov 25 - Dec 7 (Coimbra)



- Welcome and Get Started 🎥
- Introduction to Module 1 🎥
- Innovation in Medicine: Present and Future 🎥
- Future of image diagnosis 🎥
- 3D Printing (in health) 🎥
- AI (in health) 🎥
- Existing regulations and ethics in healthcare 🎥
- Real examples: 3D printing in oncologic surgery 🎥
- Real examples: 3D printing in maxillofacial surgery 🎥
- Practical examples: Image applications in research 🎥
- Real examples: Image and simulation (beyond 3DP) 🎥
- End of Module 🎥



Dedicated time: 10 h

- Introduction to Module 2: acquisition of the medical image, techniques and optimization 🎥
- [Anatomy] Anatomy of the soft tissues (thorax & abdomen) 📖
- [Anatomy] Musculoskeletal anatomy 📖
- [Anatomy] Cardiovascular anatomy 📖
- [Anatomy] Anatomy of the central nervous system 📖
- [Anatomy] Maxillary-face anatomy 📖
- [Anatomy] Maternal-fetal anatomy 📖
- [Technic] Update on medical imaging techniques I (TC) 📖
- [Technic] Update in medical imaging techniques II (RM) 📖
- [Technic] Update on medical imaging techniques III (Echography) 📖
- [Technic] Technical optimization of CT Scan 📖
- [Technic] Basic techniques of reconstruction (subtraction, multiplanar, MIP, MinP, volume rendering and surface) 📖
- End of Module 🎥



Dedicated time: 11 h



Presencial



Video



Lecture

- Introduction to Module3 🎥
- Basic post processing tools 🎥
- [Portal] Segmentation with PORTAL 🎥
- [Portal] Practical basic reconstructions 🎥
- [Portal] Flip-class session for doubts 😊
- [3D Tools] Basic concepts of 3D printing software, formats and matrices 🎥
- [3D Tools] How to use a 3D software and STL file 🎥
- [3D Tools] Creation of biomodels, surgery tools, cutting guides, implants and other modifications on the image 🎥
- [3D Tools] Flip-class session for doubts 😊
- [3D Printing] Additive manufacturing processes and types of 3D printers for medical application 🎥
- [3D Printing] Printing materials in biomedicine 🎥
- [3D Printing] Visit CIM-UPC print Fab-farm 😊
- [Simulation] Simulation techniques workshop 😊
- End of Module 🎥
- Introduction to Final Project 🎥



Dedicated time: 21h

- Introduction to Module 4 🎥
- Visualization of 3D models 🎥
- Normalization of the image for research 🎥
- Tips in acquiring the image and specific software for segmentation 🎥
- Individual segmentation, Lesion-symptom mapping, Interpretation and report of group cases 🎥
- Introduction to machine learning in image analysis 🎥
- Mathematical representation of digital images 🎥
- Advanced image filtering techniques (2 classes) 🎥
- Extraction of attributes and texture analysis (2 classes) 🎥
- Automatic classification and segmentation of Images with AI techniques (4 tutorials) 🎥
- Introduction to deep learning techniques (Convolutional Neural Networks, Deep Learning) (1 class) 🎥
- [AI] Flip-class session for doubts 😊
- End of Module 🎥
- Tutoring Final Project
- End of course: Remarks from Course Co-Directors 🎥



Dedicated time: 27h



Deadline: 2 weeks (Nov 30; Dec 7)



GRADED ACTIVITIES: Final Module Questionnaires



GRADED ACTIVITIES: Glossary ★



GRADED ACTIVITIES: Final Project



ENTRANCE AND EXIT SURVEY