



3RD ANNUAL 3D PRINTING & BIO-PRINTING IN HEALTHCARE CONFERENCE

11TH & 12TH OCTOBER 2018, BRUSSELS, BELGIUM

Deriving implant generation, bio-materialization medicine printing and organ fabrication through additive manufacturing

Event Overview

The major challenges of healthcare additive manufacturing industry lie in understanding the bio-functional nature of printed material, biomaterial applications, tissue/organ printing and insertion of the developed implants.

Over the years 3D Printing has proved its potential in the areas of tissue engineering by development of organoids, surgeries via bioprinters and pharmaceutical industry through introduction of multiple ailments.

Having completed two extremely successful editions, **3rd Annual 3D Printing & Bio-printing in Healthcare** once again aims at bringing together the key industry leaders, business heads, medical consultants, researchers and engineers from the Hospitals, Universities and Research Institutes across the globe at a singular platform. Mark your presence on **11th & 12th October 2018 at Brussels, Belgium** to endorse the innovative case studies and advancements in recent areas like implant generation, bio-materials, medicine printing and organ fabrication to reveal the potential applications of 3D Printing and Bio-printing.

Who should attend?

Technical experts and surgeons from the departments of:

- Surgery
- Orthopedics
- Urological surgery
- Maxillofacial Prosthodontics
- Cardiovascular
- Orthodontics
- Prosthodontics
- Cosmetology
- Dermatology

Professors, lecturers, medical engineers, scientists, product developer, training and development engineers, encapsulating engineers from the departments of:

- Regulatory
- Pharmaceuticals
- Hospitals
- Medical engineering
- Medical studies
- Clinical Studies
- Biomedical engineering
- Additive manufacturing
- Bio-chemical engineering

Key Highlights

- ▶ **Titanium printing** for bone fracture
- ▶ **Bell printed** implant generation
- ▶ Organ **fabrication** and **modeling**
- ▶ Printing of **vascular structure**
- ▶ Printing of **medicine**
- ▶ **Scaffold generation** for regenerative medicine
- ▶ 3D **bio-printing & tissue engineering**
- ▶ **Bone** tissue engineering
- ▶ **Skin** printing
- ▶ Surgical planning through 3D printing **simulation software**
- ▶ Stem cell-based **cartilage repair**
- ▶ Bio-functional nature of **3D printed material**
- ▶ Extrusion bioprinting of **cell-instructive bioinks**



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Advisory Panel



Jules Poukens
Chairman Department
of Cranio-Maxillofacial
Surgery
Zuyderland, Belgium



Jan Wolff
Adjunct Professor
VU University Medical
Center, Netherlands



Kirsten Borchers
Senior Scientist
Fraunhofer-Institute for
Interfacial Engineering
and Biotechnology IGB,
Germany

Expert Speaker Panel

- **Shailendra Singh (Shelly)**, COO, MarketsandMarkets
- **Zhanfeng Cui**, Donald Pollock Professor of Chemical Engineering, **IBME-UK**
- **Iain S Whitaker**, Chair in Plastic & Reconstructive Surgery, **Swansea University Medical School-UK**
- **Stuart Kyle**, Academic Clinician & Honorary Lecturer, **Swansea University, UK**
- **Kirsten Borchers**, Senior Scientist, **Fraunhofer-Institute for Interfacial Engineering and Biotechnology IGB, Germany**
- **Jenny Emnéus**, Professor, Dept. Micro and Nanotechnology, **DTU Nanotech, Denmark**
- **Andrew J. Kobets**, Resident Physician, **Albert Einstein College of Medicine, USA**
- **Alvaro Goyanes**, Post-Doctoral Research Fellow in Pharmaceuticals, **University College of London, UK**
- **Rúben F. Pereira**, Assistant Researcher-i3S, **University of Porto, Portugal**
- **Charlotte Piard**, Research Fellow, **University of Maryland, USA**
- **Jules Poukens**, Chairman Department of Cranio-Maxillofacial Surgery, **Zuyderland, Belgium**
- **S.K. Nagel**, Associate Professor, **University of Twente, Netherlands**
- **Dunlop Doug**, Consultant Orthopaedic Surgeon, Honorary Professor of Orthopaedics, **University of Southampton, UK**
- **Federico Bolognesi**, Oral and Maxillofacial Surgery Unit, **University of Bologna, Italy**
- **David Dean**, Associate Professor, Department of Plastic Surgery, **The Ohio State University, USA**
- **Gerard Giordano**, Consultant Orthopaedic Surgeon, **JDH, Toulous, France**
- **Lorenzo Moroni**, Professor, Biofabrication, **MERLN Institute for Technology, Netherlands**
- **Markus Kleemann**, Professor, Division of Vascular & Endovascular Surgery, **University Medical Center Schleswig, Germany**
- **Reinhilde Jacobs**, Professor, **KU Leuven, Belgium**
- **Ian Hennessey**, Clinical Director of Innovation, **Alder Hey Children's Hospital, UK**
- **Murtaza Tambuwala**, Lecturer of Pharmacy, **University of Ulster, UK**
- **Sandra Van Vlierberghe**, Full Professor, Polymer Chemistry & Biomaterials, **University of Ghent, Belgium**
- **Carmelo De Maria**, Research Fellow, **University of Pisa – Research Center E. Piaggio, Italy**
- **Jos Vander Sloten**, Full Professor, **KU Leuven, Belgium**
- **Avi Cohen**, Vice President, Healthcare and Education, **Xjet 3D, Israel**
- **Dionysios Douroumis**, Professor in Pharmaceutical Technology and Process Engineering, **University of Greenwich, UK**



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Day 1, Thursday 11th October 2018

08:00 Registration

08:55 Welcome note from MarketsandMarkets

09:00 Keynote Presentation by MarketsandMarkets
Shailendra Singh (Shelly), COO, MarketsandMarkets

09:15 Opening Remarks from the Chairman

Leveraging recent advances in 3D printing

09:20 **Printing of titanium alloy plates for the treatment of bone fractures**
Brian D. Giordano, Associate Professor, Department of Orthopaedics, **University of Rochester, USA**

09:45 **3D printing as a tool to provide personalized care to patients**

- Image based, patient specific planning
- Production of models, implants and surgical tools
- Quality control

Jos Vander Sloten, Full Professor, **KU Leuven, Belgium**

10:10 **Solution provider presentation arjun.kar@marketsandmarkets.com**

10:40 *Morning Refreshments and Poster Presentation | One-to-One Networking Meetings*

11:30 **3D-Printing in Aortic disease for endovascular navigation and training**

- Patient-specific 3D printed aortic pathologies, used for experimental navigation of stentgrafts
- A torso is established for training purposes

Markus Kleemann, Professor, Division of Vascular & Endovascular Surgery, **University Medical Center Schleswig, Germany**

Innovations in 3D Printing

12:55 **Mechanically optimised 3D-printed bone structures**
Jenny Ennéus, Professor, **Technical University of Denmark, Denmark**

12:20 **Should we print the mandible bone-like?**

- Is bone-like printing feasible?
- Are bone-like prints useful for research?
- Bone like prints for training
- Requirements of surgical jaw models

Reinhilde Jacobs, Professor, **KU Leuven, Belgium**

12:45 **Medical Solutions with Xjet Ceramic AM**

- Xjet Additive Manufacturing nano-jetting technology
- Ceramic Additive Manufacturing: A jumpstart of the healing process
- Advanced trends in surgical guides
- Lattices designed bones and ceramic AM
- Medical Cases: Total joint replacement, Bone Growth parts, carnio

Avi Cohen, Vice President, Healthcare & Education, **Xjet 3D, Israel**

13:15 *Lunch and Poster Presentation | One-to-One Networking Meeting*



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14:15 3D printing for pharmaceutical applications

- 3D printing (3DP) is predicted to cause a change from the mass manufacture of limited dose range medicines toward tailored-to-patient medicines prepared at hospital or community pharmacies
- The feasibility of using different 3D printing technologies to fabricate medicines and medical devices has already been demonstrated and the drug release profiles obtained can be modified by selection of the excipients and the digital design of the formulations
- To enable integration of 3DP into pharmacy practice, it is necessary to evaluate, develop and adapt these novel manufacture technologies to meet the high-quality standards that are regulated by the pharmaceutical industry, leading to new challenges and opportunities
- This presentation will cover both academic research work developed at University College London (UCL) - School of Pharmacy and industrial development at FabRx, spin off company from UCL

Alvaro Goyanes, Research Fellow in Pharmaceutics, **University College of London, UK**

15:40 Three-dimensional (3D) printed tablets: A therapeutic strategy for ulcerative colitis

- Despite extensive research in colon targeted drug delivery, we have not been able to come up with an effective way of delivering drugs to the colon
- Currently available tablets designed for colon drug release depend on either pH-dependent or time-delayed release formulations
- During ulcerative colitis, the gastric transit time and colon pH-levels is constantly changing depending on whether the patient is having a relapse or under remission. Hence, the current drug delivery system to the colon is based on one-size-fits-all fails to effectively treat ulcerative colitis
- To overcome the current issues associated with colon drug delivery, we need to provide the patients with personalized tablets which are specifically designed to match the individual's gastric transit time depending on the disease state. Three-dimensional (3D) printing (3DP) technology is getting cheaper by the day and bespoke manufacturing of 3D-printed tablets could provide the solutions in the form of personalized colon drug delivery system

Murtaza Tambuwala, Lecturer of Pharmacy, **University of Ulster, UK**

15:05 Solution provider presentation arjun.kar@marketsandmarkets.com

15:20 *Afternoon Refreshments and Poster Presentation | One-to-One Networking Meetings*

16:10 Panel Discussion: Different models of 3D Printing in healthcare

16:40 Biofabrication strategies for 3D in vitro models and regenerative medicine applications

- Develop new scaffolds able to better mimic native tissue structural properties by additive manufacturing techniques
- Develop bioprinted constructs that can serve as a 3D in vitro model and as a regenerative medicine advanced therapy

Lorenzo Moroni, Professor, Biofabrication, **MERLN Institute for Technology, Netherlands**

17:05 3D Bioprinting of Self-Standing Silk-Based Bioink based on tissue engineering

Iain S Whitaker, Professor, **Swansea University, UK**

17:30 Closing remarks by Chairman

17:35 Drinks Reception and Networking

End of Day 1



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Day 2, Friday 12th October 2018

08:30 Registration

09:15 Welcome note from MarketsandMarkets

09:20 Opening Remarks from the Chairman

3D printing and surgeries

09:25 **Three-dimensional printing of patient-specific surgical plates in head and neck reconstruction**
Zhanfeng Cui, Donald Pollock Professor of Chemical Engineering, **University of Oxford, UK**

09:50 **The gold standard in patient specific 3D Printed implants and prosthesis in cranio-maxillofacial surgery**

- 3D printing is the stepping stone to a new medical era
- 3D printing is the new technology that enables patient specific implants
- 3D printing will change the face of the medical treatment in the next decades

Prof. Dr. Jules Poukens, Chairman Department of Cranio-Maxillofacial Surgery, **Zuyderland, Belgium**

10:15 **Solution Provider presentation arjun.kar@marketsandmarkets.com**

10:45 *Morning Refreshments and Poster Presentation | One-to-One Networking Meetings*

11:35 **Biomimetic Cell Laden 3D Printed Scaffold for Bone Tissue Engineering**

- Incorporation of cells in 3D printed scaffolds for bone tissue engineering
- 3D printing of natural polymer to recreate biomimetic structures
- 3D printed perfusion bioreactor for high-volume bone scaffolds

Charlotte Piard, Research Fellow, **University of Maryland, USA**

12:00 **CAD-CAM technology in maxillofacial custom-made reconstruction: where we are today**

- Mandibular reconstruction
- Custom made reconstruction
- CAD-CAM, free- flap reconstruction- 3D planning, 3D printing

Federico Bognesi, Oral and Maxillofacial Surgery Unit, **University of Bologna, Italy**

12:25 **Virtual modeling, stereolithography and Intraoperative CT guidance for the optimization of sagittal synostosis reconstruction**

- Craniosynostosis repair is complex and requires the surgeon to reconstruct defects in a manner which is more of an artform and rather than one which follows a systematic protocol
- 3D modeling and stereolithography have emerged as novel technologies which can demonstrate repair goals to parents preoperatively and can facilitate planning by the surgeon
- Used as models intraoperatively to which the surgeon must attempt to match his or her repair, navigational confirmation of bone placement using intraoperative CT technology can further confirm repair parameters to meet preoperative goals and reassure the surgeon of proper correction before the case is completed
- Description the use of this technology in 2 cases of sagittal synostosis repair and demonstrate how the repair required modification due to identified incorrect bone placement, to ensure optimal postoperative outcome

Andrew J. Kobets, Resident Physician, **Montefiore Medical Center, USA**

12:50 **Solution Provider presentation arjun.kar@marketsandmarkets.com**

13:15 *Lunch and Poster Presentation | One-to-One Networking Meetings*

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3D printing	Bio-printing
Functional Implant Generation	Unconventional Bioprinting
<p>14:15 Development of cross-linkable (bio) polymers tuned towards their processing needs</p> <ul style="list-style-type: none"> • 3D printing, two-photon polymerization and electrospinning as processing techniques • Application of the above techniques in the biomedical field • 3D printing, hydrogels, tissue engineering, biomaterials <p>Sandra Van Vlierberghe, Full Professor, Polymer Chemistry & Biomaterials, University of Ghent, Belgium</p>	<p>14:15 Biofabrication for developing in-vitro tumor models</p> <p>Kirsten Borche, Senior Scientist, Fraunhofer-Institute for Interfacial Engineering and Biotechnology IGB, Germany</p>
<p>14:40 3D printing of metal implants -incorporation of tissues and printing of soft tissues</p>	<p>14:40 Current State of Play of 3D Bioprinting: an international overview of printing individual cells to complex hierarchical tissues and organs</p> <ul style="list-style-type: none"> • An overview of various bioinks being used in bioprinting applications for regenerative medicine • A summary of key research groups around the world who are utilising bioprinting technology to print cells, tissues and organs, highlighting the progress that has been made • Current limitations in the use of bioprinting and how these can be overcome • Future directions within the field and commentary on the clinical translation of bioprinted constructs <p>Stuart Kyle, Academic Clinician & Honorary Lecturer, Swansea University, UK</p>
<p>15:05 Bio-functional nature of 3D printed material on the application of coating</p> <p>Carmelo De Maria, Research Fellow, University of Pisa – Research Center E. Piaggio, Italy</p>	<p>15:05 Extrusion bioprinting of cell-instructive bioinks for skin tissue engineering</p> <ul style="list-style-type: none"> • Design single-component bioinks with tunable rheological and mechanical properties • Photocrosslinkable bioinks obtained by chain-growth and step-growth polymerization • Printed bioinks support new extracellular matrix deposition by embedded dermal fibroblasts • Bioprinting skin cells into 3D skin models <p>Rúben Pereira, Assistant Researcher, i3S – Instituto de Inovação e Investigação em Saúde, University of Porto, Portugal</p>
<p>15:30 Personalized implant and controllable biosystem development through 3D printing</p>	<p>15:30 Role of bioprinting to generate 3D neural tissue models</p>
<p>15:55 Closing remarks from the Chairman</p>	<p>15:55 Closing remarks from the Chairman</p>
<p>16:00 End of Conference</p>	<p>16:00 End of Conference</p>

****Guided 3D tour at Materialise HQ in Leuven by**

