



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

11TH & 12TH OCTOBER 2018, SHERATON
BRUSSELS AIRPORT HOTEL, 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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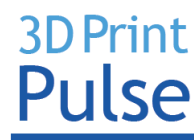
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Advisory Panel



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



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



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



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



Stuart Kyle, Academic
Clinician & Honorary
Lecturer, **Swansea
University**, UK



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



Sandra Van Vlierberghe,
Full Professor, Polymer
Chemistry & Biomaterials,
University of Ghent,
Belgium



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



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



Andrew J. Kobets,
Resident Physician, **Albert
Einstein College of
Medicine**, USA



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



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



Rúben F. Pereira,
Research Fellow, i3S -
Instituto de Investigação
e Inovação em Saúde,
University of Porto,
Portugal



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



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



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



Annabel Braem
Professor, Department of
Materials Engineering
KU Leuven, Belgium



Vladimir Mironov,
Leading Scientist,
**Institute for
Regenerative Medicine**,
**Sechenov Moscow,
Medical University
Moscow**, Russia



Gerard Giordano,
Consultant Orthopaedic
Surgeon, **JDH**, Toulous,
France



Carmelo De Maria,
Research Fellow,
**University of Pisa –
Research Center E.
Piaggio**, Italy



Mostafa Ezeldeen
Consultant,
Periodontology and Oral
Microbiology
KU Leuven, Belgium



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Expert Speaker Panel



Jenny Emnéus,
Professor, Dept. Micro
and Nanotechnology, **DTU
Nanotech, Denmark**



Dunlop Doug, Consultant
Orthopaedic Surgeon,
Honorary Professor of
Orthopaedics, **University
of Southampton, UK**



Veerle Bloemen
Faculty of Engineering
Technology
KU Leuven, Belgium



Iain S Whitaker, Chair in
Plastic & Reconstructive
Surgery, **Swansea
University Medical
School-UK**



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
Gerard Giordano, Consultant Orthopaedic Surgeon, JDH, Toulous, France

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 Extrusion bioprinting of cell-instructive bioinks for skin tissue engineering

- 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

Rúben Pereira, Research Fellow, i3S - Instituto de Investigação e Inovação em Saúde, **University of Porto, Portugal**

17:30 Closing remarks by Chairman

17:35 Drinks Reception and Networking

End of Day 1

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





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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 **Anti-infective strategies for 3D printed implant surfaces**

- Surface functionalization of implant materials
- Immobilization of antimicrobial agents through electrophoretic deposition
- Controlled release of antimicrobial agents

Annabel Braem, Assistant Professor, **KU Leuven Department of Materials Engineering, Belgium**

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 Bolognesi, 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	
14:15	<p>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>	14:15	<p>Bio-based Bioinks for printing of tissue-specific matrices</p> <ul style="list-style-type: none"> • Chemical modification of biomolecules • Analytical specification and control of the number of crosslinkable groups inserted per gram biomolecules • Formulation of printable bioinks • Specific matrices for bone, cartilage, vascularisation <p>Kirsten Borchers, Senior Scientist, Fraunhofer-Institute for Interfacial Engineering and Biotechnology IGB, Germany</p>
14:40	<p>3D printing of metal implants -incorporation of tissues and printing of soft tissues</p>	14:40	<p>Bioprinting in Space: Pioneering New Frontiers</p> <ul style="list-style-type: none"> • 3D bioprinting could be defined as a robotic biofabrication of 3D functional tissue and organ constructs from living cells and biomaterials according to digital model • 3D bioprinting in Space in the conditions of microgravity is one of novel promising and perspective research direction in the rapidly emerging field of biofabrication • There are no any doubts that systematical exploration of 3D bioprinting in Space will advance biofabrication and bioprinting technology and could be considered as new research frontiers <p>Vladimir Mironov, Leading Scientist, Institute for Regenerative Medicine Sechenov Moscow, Medical University Moscow, Russia</p>
15:05	<p>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>	15:05	<p>3D Printing for Tooth Autotransplantation: insights and lessons learned for Bio-printing</p> <ul style="list-style-type: none"> • CBCT-guided tooth autotransplantation • 3D printing for tooth replica • Treatment outcomes • Lessons learned for Bio-printing <p>Mostafa Ezeldeen, Consultant, Periodontology and Oral Microbiology, KU Leuven, Belgium</p>
15:30	<p>Personalized implant and controllable biosystem development through 3D printing</p>	15:30	<p>Role of bioprinting to generate 3D neural tissue models</p>
15:55	<p>Closing remarks from the Chairman</p>	15:55	<p>Closing remarks from the Chairman</p>
16:00	<p>End of Conference</p>	16:00	<p>End of Conference</p>