Gruppo Nazionale di Bioingegneria

XL Annual School:

"*Biofabrication: an integrated bioengineering approach for the automated fabrication of biological structures for clinical and research applications*"

September 13-16, 2021 - Aula Magna, Casa della Gioventù universitaria, Università di Padova, Via Rio Bianco, 12, 39042 – Brixen (Italy)

SCIENTIFIC ORGANIZERS
Valeria Chiono, Politecnico di Torino
Silvia Farè, Politecnico di Milano
Paolo Netti, Università di Napoli "Federico II"
Giovanni Vozzi, Università di Pisa

LOCAL ORGANIZER
Bioengineering National Group (GNB)

ORGANIZING SECRETARY
PRAGMA Congressi, Pavia

GENERAL INFORMATION

Participants	Early bird registration by July 31st, 2021	From August 1st, 2021
PHYSICAL ATTENDANCE		
Academic staff (GNB member*)	300 €	350 €
PhD student (GNB member)	140 €	170 €
Academic staff (non GNB member)	420 €	480 €
PhD student (non GNB member)	200 €	240 €
One Day registration (GNB member)	-	100 €
One Day registration (non GNB member)	-	130 €
VIRTUAL ATTENDANCE		
Academic staff (GNB member)	110 €	140 €
PhD student (GNB member)	60 €	80 €
Academic staff (non GNB member)	210 €	240 €
PhD student (non GNB member)	120 €	140 €
One Day registration (GNB member)	40 €	40 €
One Day registration (non GNB member)	70 €	70 €
Graduate Students	50 €	70 €
Undergraduate Students Light	25 €	30 €

* GNB regular membership: 50 €
** GNB student membership: 30 €
To register as a GNB member, GNB membership code is required in the registration form.
To become GNB member, please visit https://soci.grupponazionalebioingegneria.it/utenti/front/accedi.
All the registration fees, except for "Undergraduate Students Light", include the School Proceedings book, published by Patron. All Registration fees include VAT.

SPEAKERS

R. Beninatto - *Fidia, Italy*
A. Bonfiglio - *Università di Cagliari*
G. Ciardelli - *Politecnico di Torino*
M. Conti - *Università di Pavia*
F. Cordero – *Università di Torino*
C. De Maria - *Università di Pisa*
M. Fini - *Istituto Ortopedico Rizzoli, Bologna*
F. Guillemot - *Poietis, France*
L. Gribaldo - *Joint Research Center-EU Commission*
J. Groll - *Würzburg University, Würzburg, Germany*
C. Giordano - *Politecnico di Milano*
M. Gram Pedersen - *Università di Padova*
G. Imparato - *Università di Napoli Federico II*
M. Marino - *Università di Roma Tor Vergata*
M. Monaghan - *Trinity College, Dublin, Ireland.*
S. Martinoia - *Università di Genova*
V. Mironov - *3D Bioprinting Solutions, Russia*
M. Mattioli Belmonte Cima - *Università Politecnica delle Marche*
N. Contessi Negrini - *Imperial College London, UK*
I. Namro Redwan - *Cellink, Sweden*
A. Rainer - *Università Campus Biomedico, Roma*
W. Swieszkowski - *Warsaw University of Technology, Poland*
M. Zenobi-Wang, *ETH, Switzerland*

INDUSTRIAL SUPPORTERS

***Interaction with industrial exhibitors will be possible in both a physical and virtual exhibiting room.

AIMS AND OBJECTIVES

Biofabrication is the automated robotic layer-by-layer additive fabrication of 3D tissue and organ constructs, from tissue spheroids, or bioinks, including cell suspensions and cellularised hydrogels, following a digital model. Rapidly emerging 3D bioprinting technologies have been identified as the result of a "third industrial revolution", with the ambition to engineer even complex organs, such as kidneys and heart. Such technology could potentially address the current shortage of organ donors, providing immune-compatible tissues/organs. Further applications include the design of reproducible and scalable biofabricated *in vitro* tissue models for preclinical studies, in agreement with the 3Rs principle.

Full exploitation of the potentialities of biofabrication technologies requires the contribution of scientists with complementary expertise, including expert bioengineers in biomaterial design, rapid prototypying technologies, robotics, bioinformatics, computational modelling, bioimaging, nanotechnologies, biosensors, etc.

The XL Annual GNB School aims at providing Ph.D students with interdisciplinary knowledge and hand-on-training from experts belonging to the Italian bioengineering community, as well as international scientists and industrial leaders. New knowledge and critical discussion with eminent scientists and industrial leaders will contribute to inspire the new generation of young researchers in committing towards continuous advances in biofabrication technologies.

SCIENTIFIC PROGRAM

Monday, September 13

Morning
Introduction to Biofabrication

9.00-9.30 ***Presentation of the GNB School***, Prof. V. Chiono, Prof. S. Farè, Prof. P. Netti, Prof. G. Vozzi

9.30-10.30 ***The Basic Principles of Histogenesis, cell plasticity and tissue homeostasis***, Prof. Monica Mattioli Belmonte Cima, Università Politecnica delle Marche

Coffee Break

11.00-11-45 ***Mimicking the nature with biofabrication***, Prof. Wojciech Swieszkowski, Warsaw University of Technology, Poland

11.45-12.30 ***Methodological approaches for Biofabrication***, Prof. Marcy Zenobi-Wang, ETH, Switzerland

12.30-13.00 ***Overview of industrial participants***

Lunch Break

Afternoon
Bioinks and their characterisation

14.00-14.30 ***Official opening***, Prof. V. Chiono, Prof. S. Farè, Prof. P. Netti, Prof. G. Vozzi

14.30-15.30 ***Bottom-up design of bioinks as a tool to overcome current challenges in bioprinting***, Prof. Gianluca Ciardelli, Politecnico di Torino

15.30-16.30 ***Material testing and mechanical modelling in bioprinting***, Prof. Michele Conti, Università di Pavia

Coffee Break

17.00-17:45 ***Attribution of case studies to students***

Tuesday, September 14

Morning
3D BioPrinting

9.00 -10.00 ***Additive manufacturing technologies for biomedical applications***, Dr. Nicola Contessi Negrini, Imperial College London, UK

10.00-11.00 ***Computer-Aided Design for Biofabrication: basic procedures and open challenges***, Dr. Michele Marino, Università di Roma Tor Vergata

Coffee Break

11.30-12.30 ***Industrial technologies – Part I***

12:30-13:30 ***Students working to case studies***

Lunch Break

Afternoon
Industrial Perspectives

14.30-15.15 ***Development of Bioinks for 3D Bioprinting of Tissue Models***, Dr. Itedale Namro Redwan, Chief Scientific Officer, Cellink, Sweden

15.15-16.00 ***Developing hyaluronic acid-based bioinks: an industrial approach***, Dr. Riccardo Beninatto, Fidia, Italy

Coffee Break

16.30-17.15 ***Next-Generation Bioprinting for Manufacturing Tissue-Engineered Products***, Dr. Fabien Guillemot, Poietis, France

17.15- 18.00 ***Advanced Non-animal Models in Biomedical Research***, Dr. Laura Gribaldo, Joint Research Center-European Commission

18:00-18.30 ***Discussion***

Wednesday, September 15

Morning
In vitro Models

9.00-9.30 ***Physiology and Pathophysiology of bone: impact on biological preclinical models and translational research***, Dr. Milena Fini, Istituto Ortopedico Rizzoli, Bologna.

9.30-10.00 ***Electroconductive Melt-Electrowritten Biomaterial Scaffolds Replicating the Mechanical Anisotropy of Human Heart Tissue***, Prof. Michael Monaghan, Trinity College, Dublin, Ireland.

10.00-10.30 ***Brain-on-a-chip: engineered neuronal populations and microtransducer arrays,*** Prof. Sergio Martinoia, Università di Genova

Coffee Break

11.00-11.45 ***Multiorgan-on-a-chip in vitro modelling for health: the challenge of brain disorders,*** Prof. Carmen Giordano, Politecnico di Milano

11.45-12.30 ***Multiorgan tissue on chip for wellness: Food, Safety, Environment and Cosmetics*****,** Prof. Giorgia Imparato, Università di Napoli Federico II

12:30-13:30 ***Industrial technologies – Part II***

Lunch Break

Afternoon
In silico models

14.30 -15.15 ***Mathematical Cell Biology: insight into the dynamics of in silico models of cellular systems*****,** Prof. Morten Gram Pedersen, Università di Padova

15.15–16.00 ***Computational modelling of molecular and cellular biology: new perspectives in tissue engineering***, Prof. Francesca Cordero, Università di Torino

Coffee Break

16.30-16.45 ***Celebration of 40 years of GNB***

16.45-17.30 ***Award ceremony***

17.30-18.30 Lectio Magistralis "***Biofabrication: where we have been and where we are going***", Jjurgen Groll, Würzburg University, Würzburg, Germany

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Thursday, September 16

Morning
Novel Research Trends in Biofabrication

9.00-9.45 ***Conformable electronics for imperceptible sensors*****,** Prof. Annalisa Bonfiglio, Università di Cagliari

9.45-10.30 ***4D printing: smart materials and technologies for biomedical applications***, Dr. Carmelo De Maria, Università di Pisa

Coffee Break

11.00-11.45 ***In situ Bioprinting*****,** Prof. Vladimir Mironov, 3D Bioprinting Solutions, Russia

11.45-12.30 ***3D printing of biomimetic and biohybrid systems***, Prof. Alberto Rainer, Università Campus Biomedico, Roma

Lunch Break

Afternoon
Student's case studies

14.00-16.30 ***Rapid fire presentations from students with evaluation of students' activity***

16.30-17.00 ***End of the School and greetings***

Friday, September 17

8.30 – 12.30 ***GNB General Assembly (for GNB members only)***