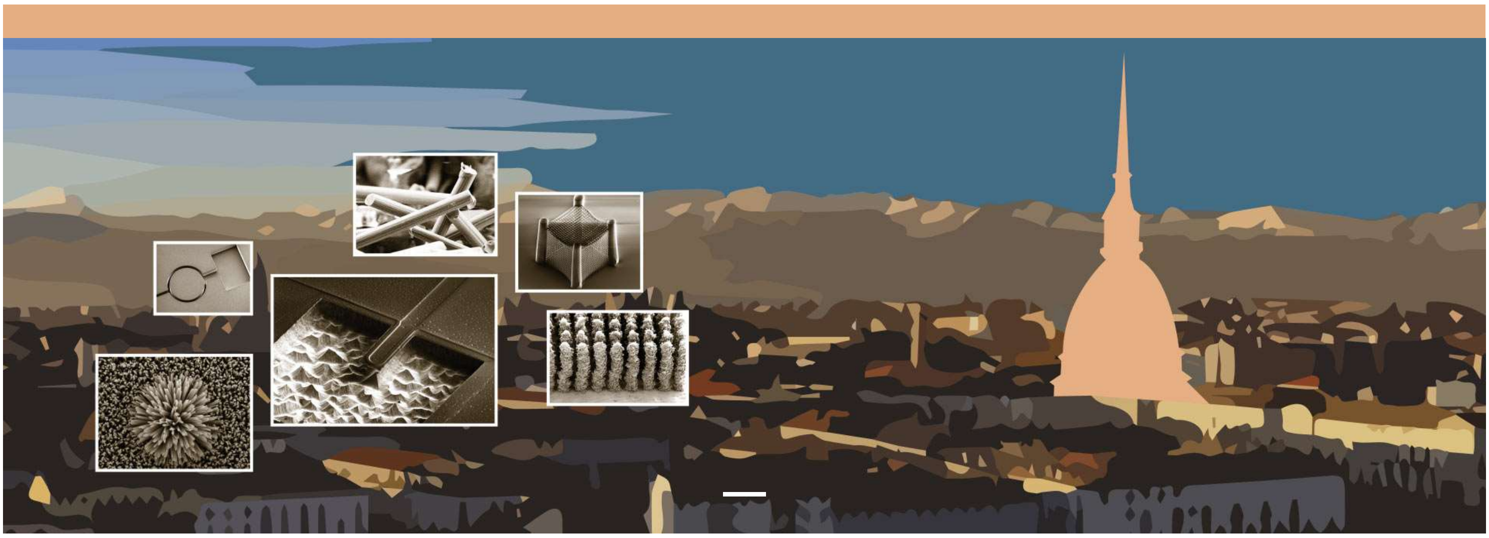

MNE2021 LIVE STREAMING

If you are a MNE registered attendee and you cannot access the streaming platform, please write to info@ibrida.io

ONLINE PROGRAM

MNE2021 PDF GUIDE

MNE2021 WILL BE HELD BOTH IN PRESENCE AND ON-LINE

IN PRESENCE ATTENDEES MUST EXHIBIT THE EU DIGITAL COVID CERTIFICATE (OR EQUIVALENT CERTIFICATE FOR NON EU CITIZENS) TO ACCESS THE CONFERENCE VENUE

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INFO for AUTHORS and PRESENTERS

47th MNE Conference

WELCOME

MNE2021 will be the **47th International Conference** in a series that started in Cambridge in 1975, and was held most recently in Braga (2017),Copenhagen (2018) and Rhodes (2019).
The MNE2020 conference in Leuven had to be cancelled because of the COVID-19 outbreak, but we are now building a new fantastic edition in Torino which will represents for micro and nano engineers and scientists the best showcase for the technology advancement achieved over the last two years.
Micro and Nano Engineering (MNE) is the flagship event of the international Micro and Nano Engineering society (iMNEs) and the premium international conference on:

- micro/nanofabrication and manufacturing techniques
- application of micro/nanostructures, devices and microsystems into electronics, photonics, energy, environment, chemistry and life sciences.

The **MNE 2021 edition** returns to Italy, after 11 years, and it will be hosted for the first time in the beautiful and charming Torino, the capital of the Piedmont Region located in the north-west of Italy. Torino, surrounded on the West and North by the Alps and on South by the famous Langhe hills, is famous for its architectural masterpieces (castles, noble palaces, and museums) and enogastronomy, with red wines, chocolate and cheese among its excellences.

The **3-day conference format** includes 3 parallel sessions, plenary talks, invited presentations, oral and poster presentations (evaluated by the International Program Committee), an industrial session and a commercial exhibition.

MNE poster papers have equal weight to oral presentations. The MNE Committees encourage authors to submit papers (regular, accelerated publications, reviews or news and opinions) to 4 thematically focused open access issues of Elsevier Micro and Nano Engineering related to the conference topics.

Elsevier also sponsors the annual Young Investigator Award, which will be presented at the conference. MNE has two sister conferences (EIPBN) in the USA, and (MNC) in Japan.

Massimo De Vittorio (MNE 2021 General Chair)
Fabrizio Pirri (MNE2021 co-Chair)

IMPORTANT DATES

CONFERENCE DATES
September 20th-23rd 2021

LATE ABSTRACTS
August 7th 2021

ACCEPTANCE NOTIFICATION
~~June 18th~~ July 3rd 2021

EARLY BIRD REGISTRATION
July 25th 2021

Multi Technology Approach for Biomedical Devices - Vat Photopolymerization and Microfabrication Hand in Hand

Julia Linert [a], Philipp Taus [a], Sonia Prado-López [a], Markus Pribyl [a], Michael J. Haslinger [b], Michael Mühlberger [b], Heinz D. Wanzenboeck [a]

[a] TU Wien, Institute of Solid State Electronics, Vienna, A-1040, Austria
[b] PROFACTOR GmbH, Steyr, 4407, Austria
e-mail: heinz.wanzenboeck@tuwien.ac.at

Microfluidic systems and chips bridge the gap of the biological micro world to our accessible macro world, creating the interface between e.g. an organoid on a chip to the reservoirs and pumps. Prototype and low volume lab scale microfluidic devices have traditionally been realized by soft lithography [1]. While this process allows for quick adoption and customization, offers high-fidelity replication of the mould, it is also a highly manual process. Furthermore, it is mostly limited to 2D and 2.5D structures due to the required demoulding step. This work focuses on directly 3D printing microfluidic structures onto a microstructured glass substrate.

Recently rapid prototyping of microfluidic devices using direct 3D printing has become widely available [2]. Inexpensive desktop-sized tools allow to 3D print microfluidic components [3]. Usually the 3D printed parts are either stand-alone systems requiring only fluidic connections, or they need to be attached to a rigid chip encompassing further analysis and processing capabilities, after printing. The attachment of a finished 3D printed part to a rigid surface is possible [4], but requires a manual alignment and handling step, or expensive automation.

In this work we demonstrate a process that allows for direct 3D printing of a microfluidic attachment onto an in-house fabricated multi electrode array chip (borosilicate glass substrate 263Teco, with sputtered gold electrodes defined by a lift-off process using the Merck AZ 5214 e image reversal resist). The process uses a desktop-sized LCD resin printer (Photon mono X, Anycubic) and commercially easily available resins (Color mix basic, 3DJake and Aqua resin 4K grey, Phrozen). We will discuss prospects and limits of the process with regards to organoid-on-chip systems. For this we will describe adhesion strength, burst pressure and post printing curing strategies. We will also discuss and compare these results to different state-of-the-art attachment strategies of 3D printed parts to rigid substrates (example in Fig.1). Here we will focus on surface properties, particularly bowing, of the prints, and how this influences the required adhesive thickness and thereby clogging tendency of channels and electrodes.

Since the projection LCD screen of the printer is fixed relative to the build plate, the reported direct print process onto the final chip also allows for an alignment free workflow (Fig.2). We will show different positioning and attachment strategies for the substrate and compare accuracy for inexpensive stencils, 3D printed attachments to the build plate, and completely customized build plates.

Biocompatibility data [5,6] is rarely reported for inexpensive commercial 3D printing resins, including the resin used in this work. Therefore, 3D printed structures were also used for quantitative cell growth and viability experiments. We will report on biocompatibility and cytotoxicity of the used commercial resin demonstrating good human fibroblast viability of the UV light cured 3D printed parts.

[1] Qin, D. et al., Soft Lithography for Micro- and Nanoscale Patterning. Nat Protoc 2010, 5, 491–502.
[2] Bhattacharjee, N et al., The Upcoming 3D-Printing Revolution in Microfluidics. Lab Chip 2016, 16, 1720–1742.
[3] Pagac, M., et al.,. A Review of Vat Photopolymerization Technology: Materials, Applications, Challenges, and Future Trends of 3D Printing. Polymers 2021, 13, 598.
[4] Kecili, S.; Tekin, H.C. Adhesive Bonding Strategies to Fabricate High-Strength and Transparent 3D Printed Microfluidic Device. Biomicrofluidics 2020, 14, 024113.
[5] Kreß, S.; et al., 3D Printing of Cell Culture Devices: Assessment and Prevention of the Cytotoxicity of Photopolymers for Stereolithography. Materials 2020, 13, 3011.
[6] Hart, C.; et al., Biocompatibility of Blank, Post-Processed and Coated 3D Printed Resin Structures with Electrogenic Cells. Biosensors 2020, 10, 152.

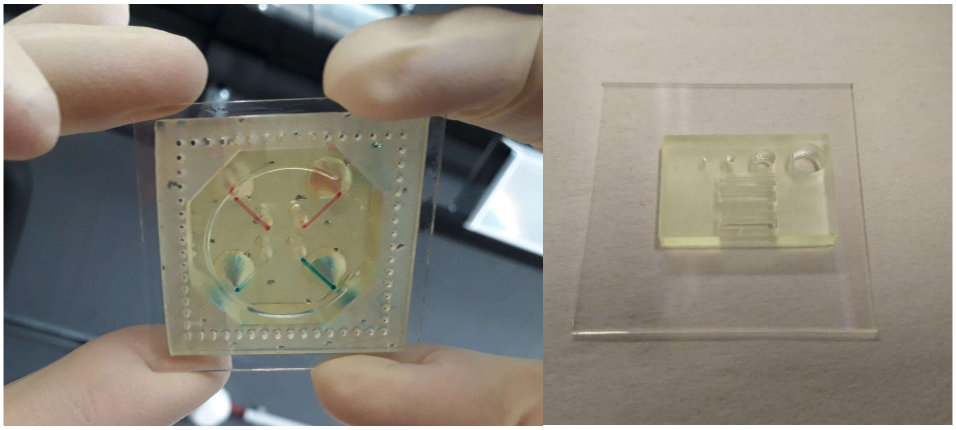

Figure 1.

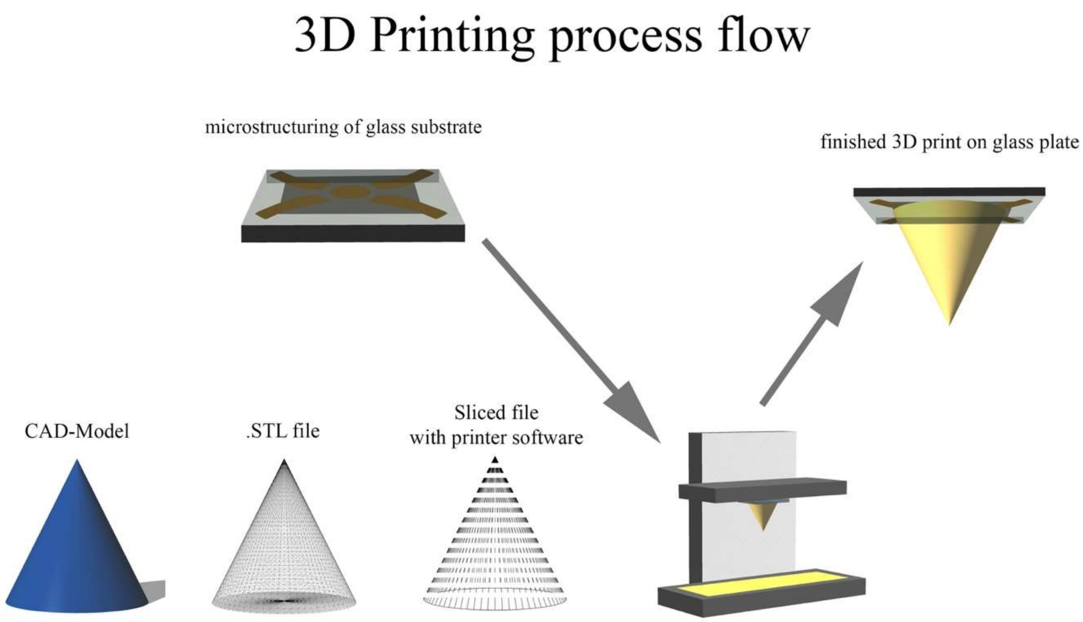

Figure 2. 3D printing process flow for direct on-chip printing.

» Mr. Kyogo Saito, Mr. Daigo Natsuhara, Mr. Kisuke Tanaka, Prof. Hiroka Aonuma[2], Prof. Tatsuya Sakurai[2], Prof. Shunya Okamoto[1], Prof. Moeto Nagai[1], Prof. Hirotaka Kanuka[2], Prof. Takayuki Shibata[1] (1. Toyohashi University of Technology, 2. The Jikei University School of Medicine)

norabadee Ranron[1], Mrs. Suphichaya Radomyos[1], Mr. Witsaroot Sripumkhai[1], Ms. Pattaraluck Pattamang[1], Ms. Rattanawan Meananeatra[1], Dr. Wutthinan Jeamsaksiri[1], Dr. Kitiya Vongkamjan[3] (1. National Electronics and Computer Technology Center, 2. Prince of Songkla University, 3. Kasetsart University)

Continued from Tuesday, 21 September

PB23-Mechanical Fingerprint of Senescence in Endothelial Cells

» Ms. Nafsika Chala[1], Dr. Silvia Moimas[1], Dr. Costanza Giampietro[2], Ms. Xinyu Zhang[1], Prof. Tomaso Zambelli[1], Mr. Vasileios Exarchos[3], Dr. Timo Z. Nazari-Shafti[4], Dr. Aldo Ferrari[5], Prof. Dimos Poulikakos[1] (1. ETH Zurich, 2. EMPA Dübendorf, ETH Zurich, 3. German Heart Center Berlin, 4. German Heart Center Berlin, Berlin Institute of Health at Charité – Universitätsmedizin Berlin, 5. ETH Zurich, EMPA Dübendorf)

PB25-Portable electronic nose based on individual sensor for environmental monitoring in museums

» Dr. Guillem Domènech-Gil[1], Dr. Donatella Puglisi[1] (1. Linköping University)

PB27-Fabrication of interdigital electrodes with barriers and nanofibers for enhanced impedance bio-sensing in a microfluidic device

» Dr. Haoyue LUO[1], Mr. Feng Liang[1], Dr. Boxin Huang[1], Dr. Juan Peng[1], Dr. Xiaochen Huang[1], Dr. Li Wang[2], Dr. Jian Shi[2], Prof. Yong Chen[1] (1. PASTEUR, Département de chimie, École normale supérieure, PSL University, Sorbonne Université, CNRS, 2. MesoBioTech)

PB29-Whey Proteins/Zinc Oxide bionanocomposite hydrogels as sustainable antimicrobial platforms

» Mr. Paolo Pino[1], Prof. Barbara Onida[1], Prof. Francesca Bosco[2] (1. Politecnico di Torino, 2. Applied Science and Technology Department, Politecnico di Torino, Torino, 10129, Italy)

PB31-Manipulating and characterizing individual bio-particles in nanochannels

» Dr. Christian Höller[1], Dr. Gabriel Schnoering[2], Dr. Hadi Eghlidi[1], Prof. Dimos Poulikakos[2], Dr. Maarit Suomalainen[3], Prof. Urs Greber[3] (1. Laboratory of Thermodynamics in Emerging Technologies, ETH Zurich, Sonneggstrasse 3, Zurich, Switzerland, 2. ETH Zurich, 3. Institute of Molecular Life Sciences, University of Zurich, Zurich, Switzerland)

PB33-Fabrication and Replication of Dense High Aspect Ratio Nanostructures for Cell Chip Applications

» Mr. Markus Pribyl[1], Mr. Philipp Taus[1], Dr. Samuele Maria Dozio[1], Dr. Sonia Prado-López[1], Mr. Sebastian Knafl[1], Dr. Michael Haslinger[2], Ms. Sonja Kopp[2], Dr. Michael Mühlberger[2], Ms. Alison Deyett[3], Dr. Sasha Mendjan[3], Prof. Heinz Wanzenboeck[1] (1. TU Wien, 2. Profactor GmbH, 3. IMBA of the Austrian Academy of Sciences)

PB35-Effect of Micro/Nanostructured Polystyrene Substrates onto Adhesion, Viability and Differentiation of Adipose Tissue Derived Mesenchymal Stem Cells

» Dr. Anastasia Kanioura[1], Dr. Angelos Zeniou[2], Dr. Panagiota Petrou[3], Dr. Adamantia Papadopoulou[4], Dr. Eleni Mavrogonatou[4], Dr. Dimitris Kletsas[4], Dr. Angeliki Tserepi[5], Dr. Evangelos Gogolides[3], Dr. Sotirios Kakabakos[6] (1. Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety, NCSR "Demokritos", Aghia Paraskevi, 15341, Greece, 2. Institute of Nanoscience and Nanotechnology, NCSR Demokritos, 3. NCSR Demokritos, 4. Institute of Biosciences and Applications, NCSR "Demokritos", Aghia Paraskevi, 15341, Greece, 5. Institute of Nanoscience & Nanotechnology, NCSR "Demokritos", Aghia Paraskevi, 15341, Greece, 6. NSCR "Demokritos")

PB37-Waste liquid assisted flow-switching on a centrifugal microfluidic platform

» Mr. Ehsan Mahmodiarimand[1], Mr. Gustav Grether[1], Prof. Roland Zengerle[1], Dr. Nils Paust[1], Dr. Jan Lüddecke[1] (1. Hahn-Schickard)

PB39-Multi Technology Approach for Biomedical Devices - Vat Photopolymerization and Microfabrication Hand in Hand

» Ms. Julia Linert[1], Mr. Philipp Taus[1], Dr. Sonia Prado-López[1], Mr. Markus Pribyl[1], Dr. Samuele Maria Dozio[1], Dr. Michael Haslinger[2], Dr. Michael Mühlberger[2], Prof. Heinz Wanzenboeck[1] (1. TU Wien, 2. Profactor GmbH)

3:30pm **Poster Session - Odd Numbers - Micro and Nano Devices for Electronics, Photonics, Physical Applicatons & Energy**

PC1-Simulate the effect of various Nano-fluids to improve the performance of industrial heat exchangers

» Mr. milad Darboui[1], Mr. reza feridoni[2], Mr. Ebrahim Tajedinejad[3] (1. Micro & Nano Electromechanic, 2. chemical engeneer, 3. Nano technology)