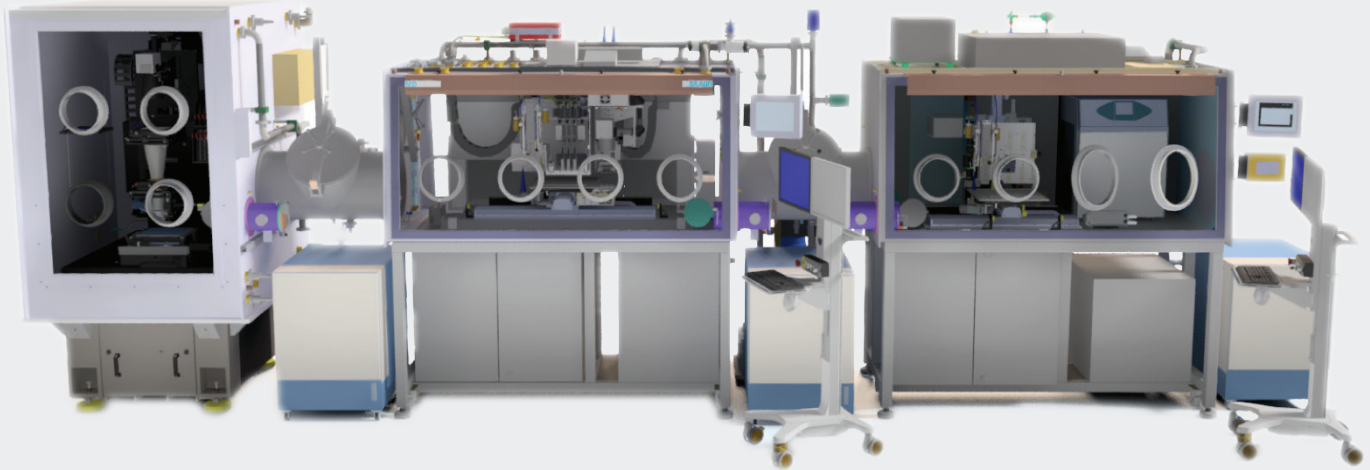




PILOT LINE FOR BIO-MICROSYSTEMS DEVELOPMENT A New Disruptive Manufacturing Platform at NUI Galway



The system enables the realisation of both bio-fabricated and electronically-fabricated components using integrated scalable digital manufacturing methods.

Microfluidics, printed electronics and printed biomaterials can all be incorporated using this system on a single device. The three-module glove box combines both precision additive and precision subtractive processes to realise next generation thermally, electrically and optically activated smart medical devices or tissue engineered lab-on-a-chip devices.

Module 1

Laser scanning and mask imaging techniques.

Ultra-precise high-throughput micro-patterning.

Shaped micron-sized recessed features.

Complex precision microfluidic pathways.

Step and repeat for areas up to 250 mm x 250 mm.

Module 2

Laser additive electronic printing. Three industrial inkjet print heads for conductive / non-conductive track deposition.

Two spray heads for large area deposition.

Integrated laser for precision sintering and selective patterning.

Iterative processes for multi-material deposition.

Module 3

Additive biomaterial printing. Pico-litre precision.

Two spray heads for large area deposition.

Photo-, thermal and chemical cure.

XYZ θ precision stage with camera alignment.

Integrated cell incubator.

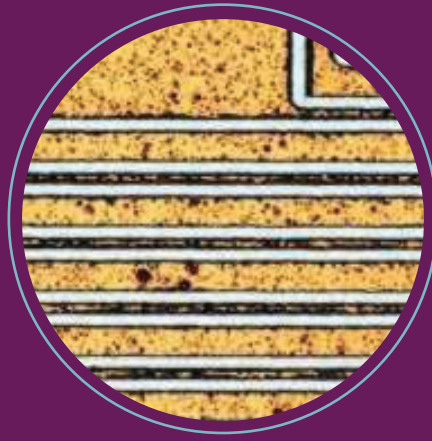
UV disinfection.

SYSTEM VERSATILITY



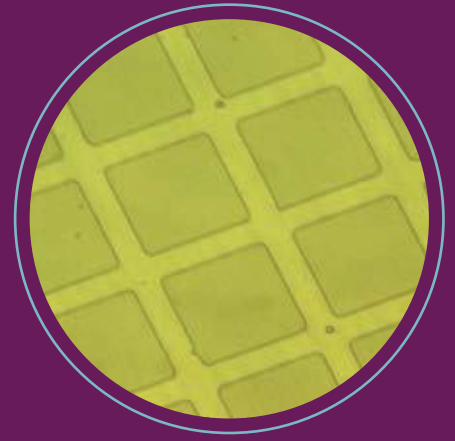
Module 1

Micro-patterned polymer surface



Module 2

50µm wide silver tracks printed on polymer



Module 3

Laser patterned hydrogel

Capability to process metals, ceramics, organics, nano-materials and biodegradable electronics

Digital and reconfigurable through utilisation of the latest CAD CAM packages for tool control

Simulates high-throughput scalable processes on either cylindrical or planar geometries

Multi-functional, multi-material, smart medical devices are transforming healthcare. Laser enabled printed electronics and biomaterials can enable new therapeutic and diagnostic medical devices. This facility located in the NCLA Laser Laboratory at NUI Galway provides the opportunity to efficiently produce prototypes using scalable pilot production, significantly enhancing the translation of R&D concepts into product prototypes.

SFI Research Centres I-Form (advanced manufacturing) and CÚRAM (medical devices) are available to provide support for industry seeking access to this manufacturing platform.

For enquiries, access or training contact:

gerard.oconnor@nuigalway.ie

john.oliver@i-form.ie (I-Form)

arun.thariath@nuigalway.ie (CÚRAM)

www.ncla.ie

www.i-form.ie

www.curamdevices.ie

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NUI Galway gratefully acknowledges the contributions made by system manufacturer, M-Solv Ltd., in the design, development and fabrication of the module. www.m-solv.com

