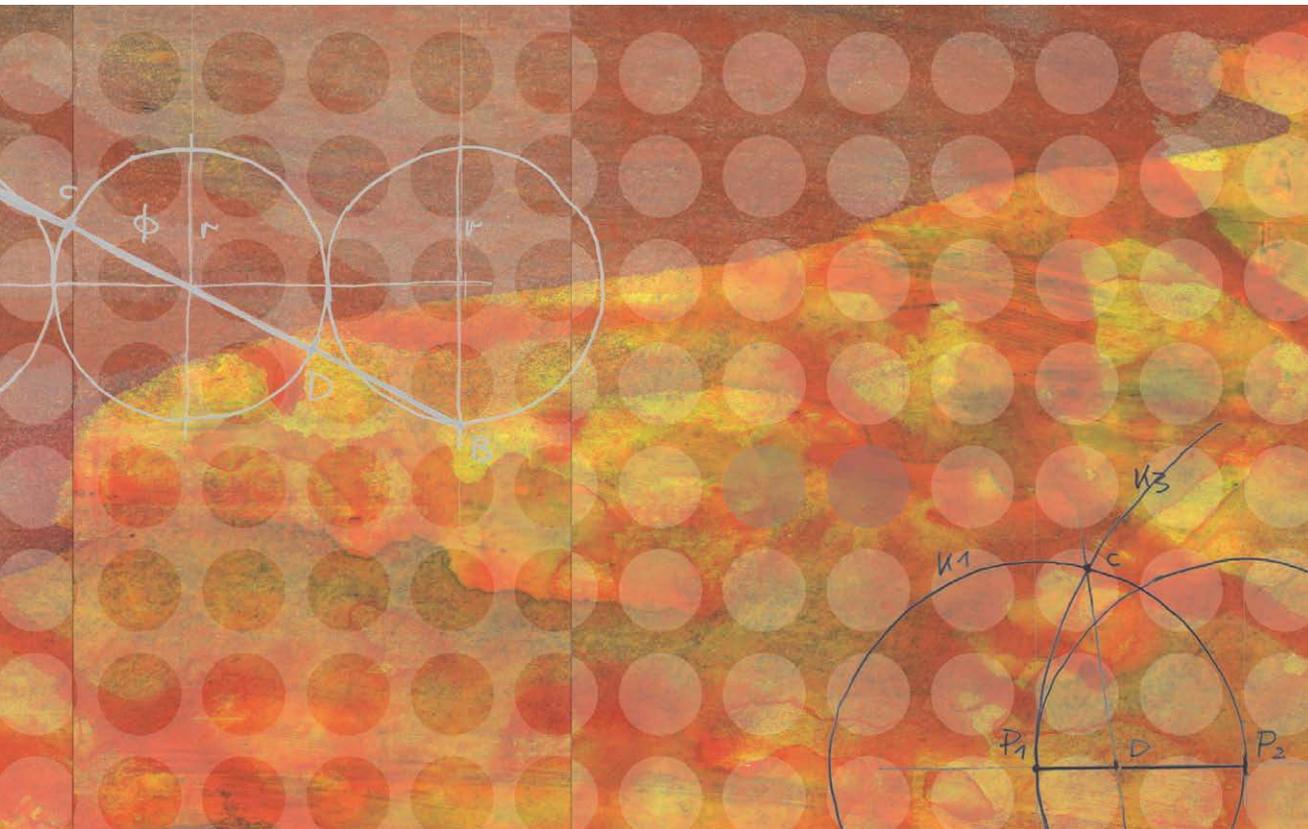


Integrating the Worlds of Micro and Macro Technology



Nano-Plotter



MicCell



μContactPrinter



BioScaffolder



BioSynthesizer

GESIM

About the GeSiM mbH

Our privately owned company, founded in 1995 at the renowned HZDR research centre in Dresden, set out to become a key player in the field of microsystems technology and a provider for made-to-order micro-components of silicon, glass, and plastic. Meanwhile GeSiM has evolved into a highly innovative bioinstrumentation company offering five instrument platforms for microfluidics, sub-nanolitre liquid dispensing, 3D printing, microcontact printing, chemical synthesis and many other facets of lab automation.

First and foremost, GeSiM stands for the development of novel and individual technical solutions and applications. For both end customers and OEMs, our engineers are keen to design components or full systems from scratch or customize our existing standard instruments. Researchers and entrepreneurs in the life sciences and other fields around the globe already rely on our technology. Being a small enterprise, GeSiM is committed to quick decision making and maintaining close contact to our customers and distributors, and has helped customers on their way to prospering businesses. As a high-tech supplier, we have also frequently taken part in research projects.



GeSiM's piezoelectric picolitre pipetting tips produced by silicon-glass micromachining are the heart of the GeSiM **Nano-Plotter**, a platform with up to 16 of these non-contact dispensers for spotting microarrays and

Microdispensing and Microarraying

biochips “on the fly”. The instrument comes in two sizes and with many extras, such as drop-let volume measurement, double wash station, cooled microplate and substrate holders, humidifier, a variety of GeSiM and third-party dispensers (including solenoid valve and pins), a microscope to aid in the spotting onto tiny objects, a plate handler, spot analysis during printing, and much more. The Nano-Plotter is modular and can thus grow as required, in research labs as well as in the diagnostics industry.



3D Bioprinting

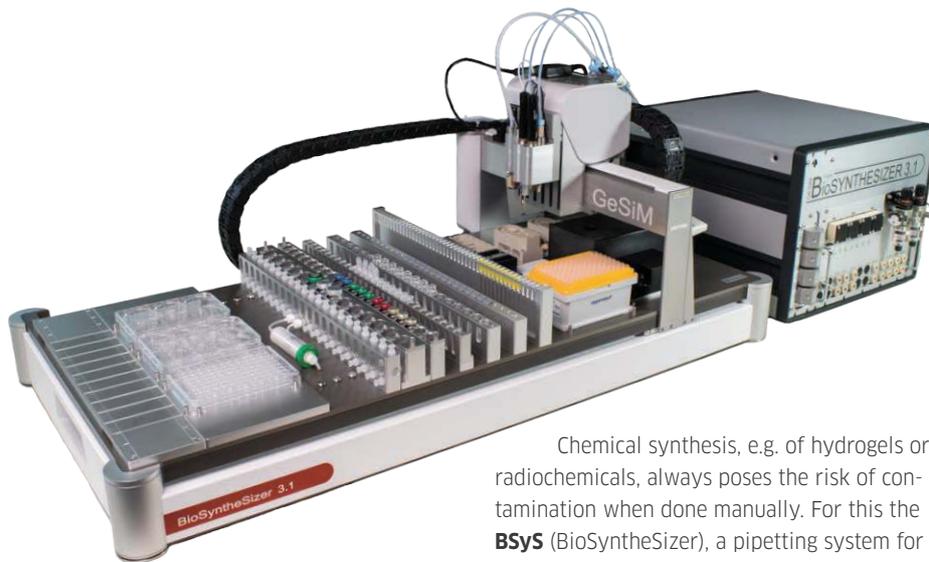
The GeSiM **BioScaffolder** uses air pressure actuation or piston extrusion to build scaffolds from various biomaterials/hydrogels (e.g. alginate, collagen, bone cement) and plastic using independent Z-drives carrying heatable/coolable cartridge holders and various other tools. What sets this system apart is the integration of piezo ink-jet microdispensing, allowing to spot proteins, cells and other biomaterials on top or between scaffold layers, all with an easy to use graphical user interface. With options such as comfortable CAD data import, UV illumination, core/shell printing, melt electrospinning, plasma coating and much more, together with its open architecture, the system is ideally suited for 3D cell culture and tissue engineering. There are also platforms with linear motors and even more functions.





Microcontact Printing

In microcontact printing (μ CP), (bio)molecules are transferred from an elastomer stamp to a flat surface in a simple way. Our **μ Con-tactPrinter** takes the risk out of this, often manual, operation. The patented, pneumatically controlled stamping technology generates 2D patterns by μ CP, but also enables the reproducible transfer of 3D structures via nanoimprint lithography (NIL), both down to the nanoscale. Depending on the configuration, the fully automatic system includes a stamp casting station, various stamps, manual or automatic substrate adjustment/heating, picolitre dispensing, spin coating, UV illumination, and much more. PTFE-coated silicon masters for easy stamp fabrication are manufactured by GeSiM. Larger platforms with a lot more tools and linear motors are available.



Chemical synthesis, e.g. of hydrogels or radiochemicals, always poses the risk of contamination when done manually. For this the **BSys** (BioSynthesizer), a pipetting system for unsupervised operation, was developed. Aside



Microscale Chemical Synthesis

from safety and flexibility, this system saves chemicals and processes different protocols in parallel, again with a multi-Z tool head. As always, a clear user interface helps to define the sequence of events. Heatable reactor, powder dispensers even for single (!) particles, multi-lumen pipette with vacuum gripper, flip cap opener, handling of disposable tips and/or Luer needles, pH titration pipette and a twin dispenser for in-flight mixing of droplets are among the ever growing list of tools; so the picture shows only one of the countless possibilities. A high-throughput system with linear motors and even more functions exists.



Microfluidics

Miniaturization has become central in bioanalytics and chemistry, as it speeds up experiments and saves money. From its earliest beginnings, GeSiM has devoted itself to the development of tailor-made miniaturized components and flow-through systems from various materials using methods of microchip manufacturing, in our own clean room. We also offer packaging, precision mechanics and software development. This work led to the development of off-the-shelf systems such as flow sensors and microvalves, and a mi-

croperfusion system with silicone elastomer (PDMS) channels for microscopes, the **MicCell**. Its specialty is a standardized chip-to-world interface, easy handling (allowing to reuse many parts) and modularity. A casting station, different fluidic system sizes, a complete macrofluidic environment (syringe pumps, valves, mixers, software), and accessories such as silicon masters, hydrogel microvalves, and microelectrodes complete this versatile system. We also offer customized multi-layer foil-based microfluidic chips, including filters.



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