

Microfluidic Capabilities

*When we “meet”
on the orange
couch, we can
discover and
design microfluidic
solutions together.*



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OUR PROCESS 2

PDMS PROTOTYPING 3

PRECISION PRINTING
4

COATINGS 5

ABOUT US 6

Our Process



01 / Contact Us

Easy and fast responses from our out-of-the-box experts



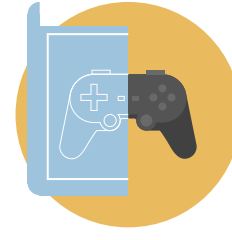
02 / Brainstorming

Your ideas plus our curiosity and the experience of over 1,000,000 devices



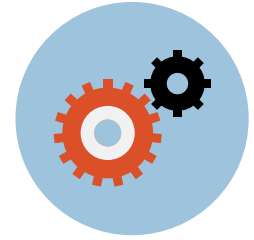
03 / Research and Design

You get the best design when you mix science, engineering and experience



04 / Rapid Prototyping

Fast prototypes and we become your laboratory outside your laboratory



05 / Manufacture

Scale-up without headaches and without high overhead

PDMS Prototyping

Overview:

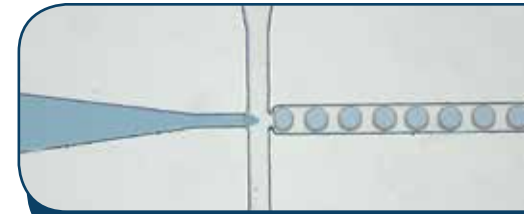
Soft-lithography, the molding of microscale features such as microchannels into soft polymers like polydimethylsiloxane (PDMS), has become a mainstay of biological and biochemical research. Harness the power of microfabrication to answer your scientific questions without investing limited resources in your lab's own capabilities. Our foundry services offer rapid prototyping and iterative evaluation. We can scale up your designs beyond the research and testing phases for manufacturing.

Capabilities include:

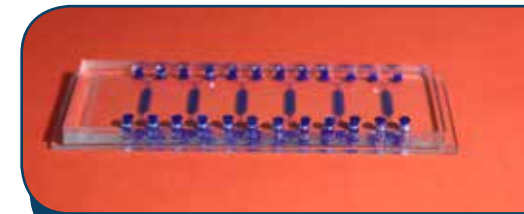
- Feature sizes down to 10 μm in the x-y plane
- Feature heights from 5 μm to 250 μm in the z-direction
- Substrates as large as 100 mm in diameter
- Multi-level structures possible
- PDMS/glass bonding available
- Chemical surface modification available (see page 5 for Coatings)

Application Examples:

- **Droplet Generation** - Droplet microfluidic technologies have undergone rapid progress over the last decade, offering the ability to form thousands of monodisperse droplets per second. In digital PCR, researchers can accurately identify and quantify DNA.
- **Cell Studies** - Cell research at the microscale not only offers microenvironmental control both spatially and temporally, but also reduces reagent volume and allows for high throughput experimentation with multiplexed designs.
- **Microscale Reactors** - Microfluidic reactors offer high resolution spatial and temporal control over fluid dynamics and reaction chemistries, with applications in mixing, protein crystallization, cell assays, high-throughput screening, and many more.



Droplet Generation



Cell Studies



Microfluidic Reactors

Precision Printing

Overview:

Our micro-printing services offer cost-effective solutions for commercializing your device or when your microscale designs require more flexibility than soft-lithography can offer. Print essentially any design imaginable on any substrate conceivable. Unlike other approaches, such as molding or chemical etching, this economical prototyping method offers precision microscale patterns with easy iteration, low minimums, and low pricing. Our process remains the same despite the scale of production, so you can be confident your design will transition to mass manufacturing seamlessly. We can work with your specific design or collaborate with you to develop a new pattern.

Capabilities Include:

Ink

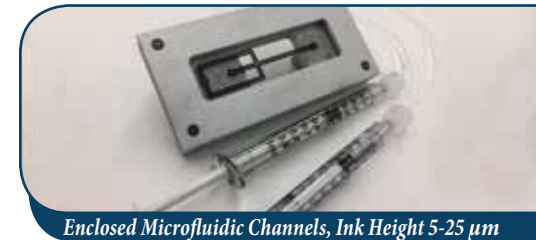
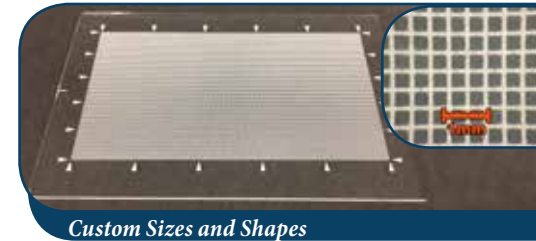
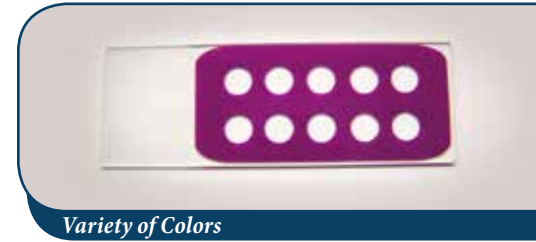
- Height between 5-25 μm
- Feature sizes down to 50 μm
- Variety of colors available
- Hydrophobic, superhydrophobic (water-air-ink contact angle $\geq 140^\circ$), and conductive compositions

Substrates

- Plastics, glass, ceramics, silicon, circuit boards, and more
- Custom sizes and shapes, e.g., round/rectangular
- Enclosed microfluidic channels
- Sterilization optional

Application Examples:

- **Microwells** - For a stronger signal, use micropatterned wells for sample preconcentration.
- **Microfluidic Circuits** - If your sample too small for standard techniques, use microfluidic circuits printed onto the substrate of your choice, including well plates.
- **Printed Droplet Generator** - Droplet generation with the optical and chemical benefits of glass at the low cost of plastic.



Coatings

Overview:

Surface chemistry matters, especially at the microscale. Scientific Device Laboratory's foundry offers a variety of different glass coatings to improve your experimentation, customized to fit your needs. Many of the coatings work on other substrates, such as PDMS, as well. We also have the capabilities to micropattern your surfaces, giving you an extra level of control. Optimize your experiments even further by combining coated slides with other SDL technologies.

Application Examples:

- **Cell adhesion** - Silane coupling agents can improve the adhesion of epithelial cells stained with a fluorescent dye.
- **Patterned wells** – Segment your cell population into individual reactors by simply dipping your patterned slide into a culture flask. Identify novel organisms as well as culture and perform separations in parallel.
- **Open-channel microfluidic channels**
 - Our 'Stick-n-Slide' process can be used to create microfluidic pathways on a planar glass substrate.

Capabilities Include:

Hydrophilic/Hydrophobic/Superhydrophobic coatings:

- For applications where wettability is crucial, covalently-bound coatings can either enhance the natural hydrophilicity of glass or prevent water from wetting.
- Nanostructured, optically clear superhydrophobic coatings result in air-water-substrate contact angles of 150° or more.
- Coatings are completely transparent and resistant to moisture, heat, and ultraviolet light.

Stick-n-Slide:

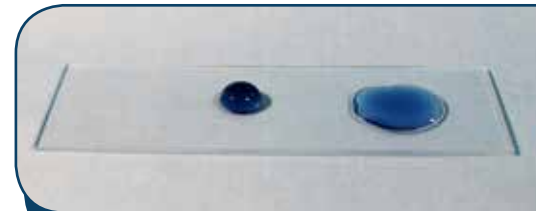
- Make your aqueous solutions stick where they need to, and slide off everywhere else.
- Our hydrophilic/hydrophobic/superhydrophobic chemistries can be patterned into arbitrary two-dimensional geometries with dimensions down to 10 μm .
- Substrate sizes can be as large as 100 mm in diameter.

Functional Surface Chemistries:

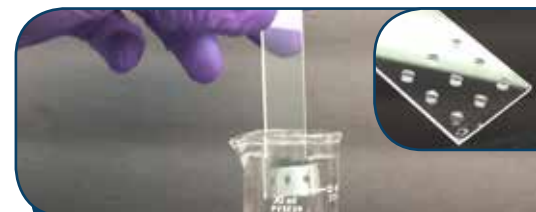
- We offer a wide variety of silane coupling agents to improve adhesion of peptides, cells, nucleic acids, and polysaccharides to our glass substrates.
- Functionalize glass surfaces with protein-repellent polymers to reduce non-specific analyte adsorption or cell adhesion.



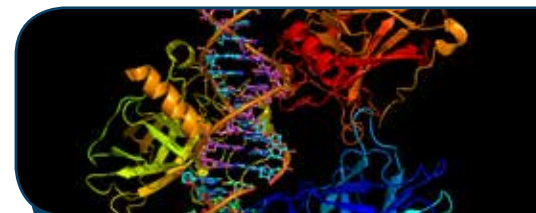
Hydrophobic Coatings



Hydrophilic Coatings



Stick-n-Slide Process



Functional Surface Chemistries



About us

Stewart Lipton (an entrepreneurial microbiology Ph.D.) and Roberta Lipton (a scrappy accountant) began packaging our novel microbiology products on the washing machine in 1982. In no time, we doubled our space and moved onto the dryer. We matured and built a loyal circle of customers. By 1992 we launched our most innovative product line, microscope glass slide printing. The 'out-of-the-box' thinking we encourage in all our people emboldened us to experiment with novel inks and unique coatings. We've made over a million simple, elegant, and transformative tools for the laboratory in our 30 years and we're still curious about solving new problems.

Solutions developed for scientists. By scientists.

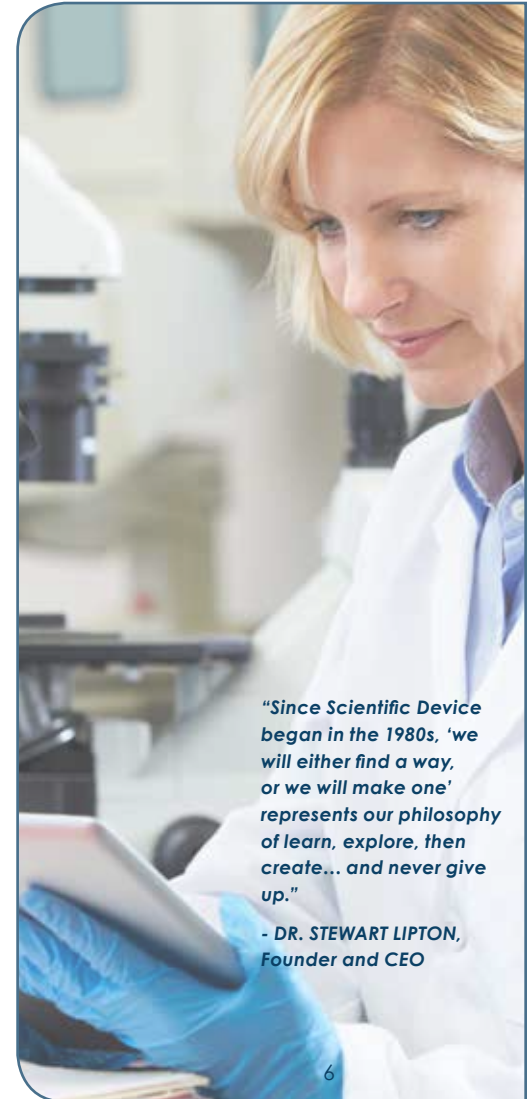
*We use the orange couch as a symbol of what we do and how we do it.
The orange couch is our symbol of creative exchange of ideas.
You've never seen a scientific company look like this, but then
again, you've never gotten results from a firm like ours.*



Get started now by collaborating on an innovative solution with our scientists and engineers. Speak to a scientist today 847.803.9495 to discuss the best way to affordably and quickly meet your labs goals.



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"Since Scientific Device began in the 1980s, 'we will either find a way, or we will make one' represents our philosophy of learn, explore, then create... and never give up."

***- DR. STEWART LIPTON,
Founder and CEO***