

## Oxford Lasers' expanding micro-processing activities

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The advantages of ultraviolet pico-second lasers for the manufacture of reusable glass microfluidic channels have been established in several laboratories, which is leading to the rapid prototyping of new generations of medical devices.

There has been a strong growth in microfluidic systems in recent years, with many new commercialised microfluidic products with applications including: medical diagnostics, genetic sequencing, chemistry, drug delivery, and proteomics. Glass is of particular interest for microfluidics, since it is extremely chemically inert and, in the context of medical devices, biocompatible.

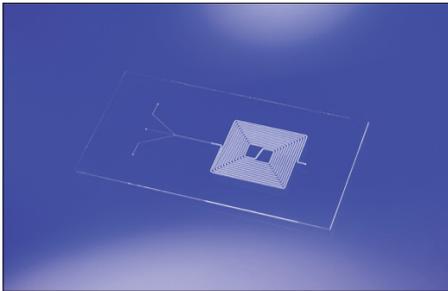


Figure 1: Rapid prototyping of a glass microfluidic device using a Talisker picosecond laser. (Courtesy Fraunhofer ICT)

Laser materials processing allows a direct write process, which is a more flexible option than traditional photolithography and chemical etching, see figure 1. In this work a ultraviolet 10 ps pulsed laser was used (a Coherent Talisker laser) for rapid prototyping of new designs of microfluidic structures. The combination of the short laser pulse duration and the short wavelength created microfluidic channels with smooth channel sidewalls and bottoms, and without microcracks.

Oxford Lasers Ltd, a laser micro-machining system integrator that provides subcontract services, has integrated a Talisker multi-wavelength picosecond laser to produce a state-of-the-art ultrafast laser system to complement its laser micro-machining service capabilities.

Figure 2 shows the new J Series system, which has stages of 800 mm x 400 mm, with sub micron resolution, high quality Galvo scanners, vision systems and a high accuracy auto-align system. This investment allows Oxford Lasers to rapidly turn around new prototype



Figure 2 Oxford Lasers J Series, Ultrafast System

microfluidic devices in a wide variety of glass types, as shown in figure 3.

Alan Ferguson, Sales Director at Oxford Lasers, pointed out that the new system was a significant new acquisition for the company. "We are currently seeing strong growth in job shop sales and this new ultrafast system complements the nanosecond systems we already have," he said. "The laser process and technology is now mature and ready for commercial exploitation and the benefits of single, direct write manufacturing of novel device designs without the need for multiple step photolithography makes this a particularly attractive application".

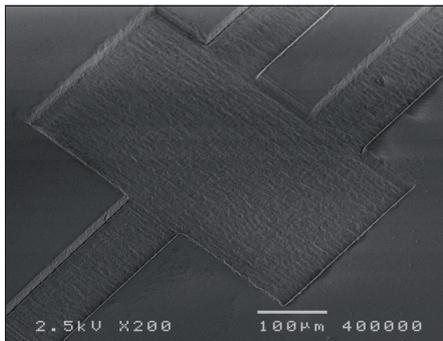
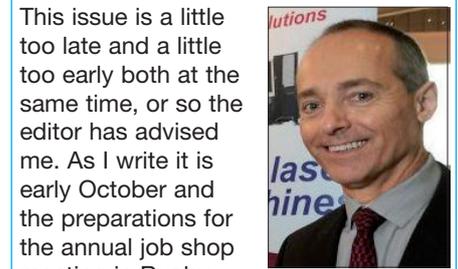


Figure 3: Example of microfluidic device (20 µm depth) in Borosilicate fabricated in Oxford Lasers Ltd Job Shop facilities, using their new J series system

"We see this system as being ideal for not only the creation of microfluidic devices, but also thin film patterning, transistor trimming and many other applications where there is a demand for machining difficult materials with high quality," Alan added.

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This issue is a little too late and a little too early both at the same time, or so the editor has advised me. As I write it is early October and the preparations for the annual job shop meeting in Rugby are well under way: so if you haven't booked your place then by the time you read this it's probably too late and you've missed out.

I hope to report on the meeting during the next issue but as I write I'm looking forward to meeting everyone again, this time at MSS Laser in Rugby, and hearing the results of the gas and supplier satisfaction survey. Especially the satisfaction survey!

John Powell sent an email to a number of job shops recently to ask how busy they were at the moment. It seems that despite the recent growth figures for the UK economy, things have been slow for many laser job shops. At Midtherm we've been quite busy, though this activity includes us implemented some changes in the business. I hope that any slight down turn in business was to do with it being the end of the holiday period and that as you read this piece the subcontract sector as a whole will be feeling a lot more positive.

I've been pleased to see that a few comments have been posted on the AILU job shop committee forum. It's worth remembering that any AILU member can log on and post a question or comment on the Technical forum, and any laser job shop member can also post onto the job shop forum.

Posting on an AILU forum is usually well worthwhile. For example, concerns over some very competitive quotes raised questions of what the true cost to laser-based manufacture is, and it was comforting to know that most of us offered similar figures. There will always be the occasional uneconomic quote but in my experience it's short lived and nothing to worry about.

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