



# Advances in Optical Metrology for Difficult Surfaces

Vamsi Velidandla  
Zeta Instruments

2528 Qume Drive, Suite 12, San Jose, CA 95131

Non-contact optical metrology is critical for research applications wherein the sample cannot be contaminated via a stylus (contact profiler) or an AFM (atomic force microscope) tip. Traditional optical profilers such as interferometers have severe limitations in terms of the surface roughness, material properties, step height range or surface reflectivity that they can handle. The next generation bio-technology applications including microfluidics and microneedles require tools that can accurately inspect transparent surfaces, high aspect ratio, high wall angle as well as embedded surfaces. The ZDot™ optical profiling technology invented by Zeta Instruments overcomes the disadvantages of traditional optical profilers with an optical design that has high light throughput and is inherently insensitive to vibration and sample tilt. This enables unmatched metrology capability for demanding research applications. In this paper we will cover the key features of the ZDot™ technology and present several examples of key research measurements enabled by it.

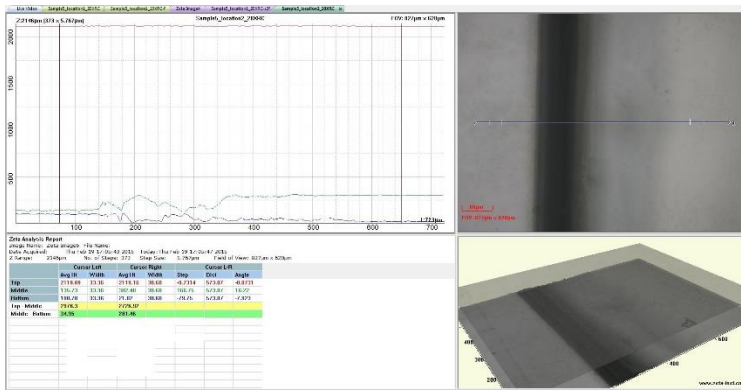


Figure 1: Multi-layer 3D scan of a micro-fluidic device. The Zeta Optical Profiler can accurately image channels and features through a top cover glass. Transparent surfaces with very low reflectivity are easily handled by the ZDot™ technology.

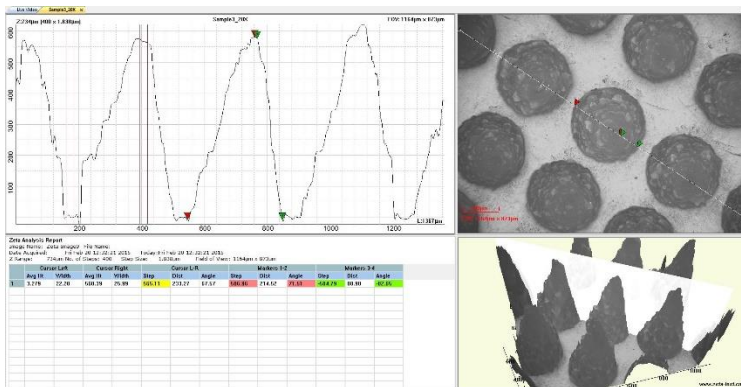


Figure 2: High aspect ratio microneedles imaged with a Zeta-20 optical profiler.