

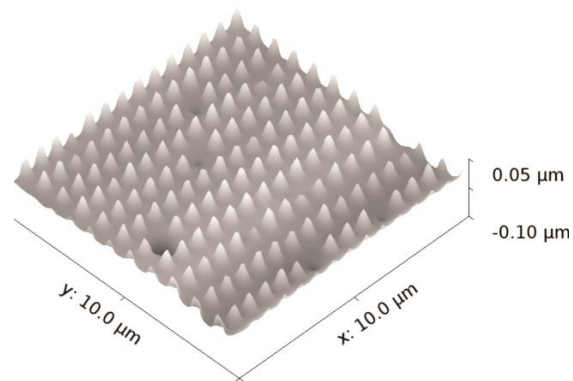
# Micro- and Nano-patterning of Freestanding Protein Films

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Biodegradable casein films have significant potential for use as non-supported stand-alone sheeting in orthopaedic implants<sup>1,2</sup> and tissue engineering substrates<sup>3</sup>. Multi-scale surface patterns can be used to modulate and guide cell interaction by means of an engineered construct<sup>4</sup>. The majority of work on cell-pattern interaction has so far focused on non-degradable materials. In this paper we demonstrate for the first time the fabrication of micro- and nano-scale geometric patterns on the surface of a crosslinked biodegradable casein film. To achieve this we introduce a two-step fabrication procedure based on polydimethylsiloxane (PDMS) soft-lithography. We will show the reproduction of micro- and nano-scale patterns in liquid-cast casein films. We also demonstrate film formation and cross-linking using glutaraldehyde and discuss the use of these films as cell-culture substrates.



**Figure 1** Atomic force microscopy image of a nano-scale casein dot array fabricated in photoresist by interference lithography and transferred into casein biopolymer via PDMS replica molding.

## References:

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