

Fabrication of Micro and Nanostructures by Focused Ion Beam

Xichun Luo^{1*}, Jining Sun², Nitul Rajput¹

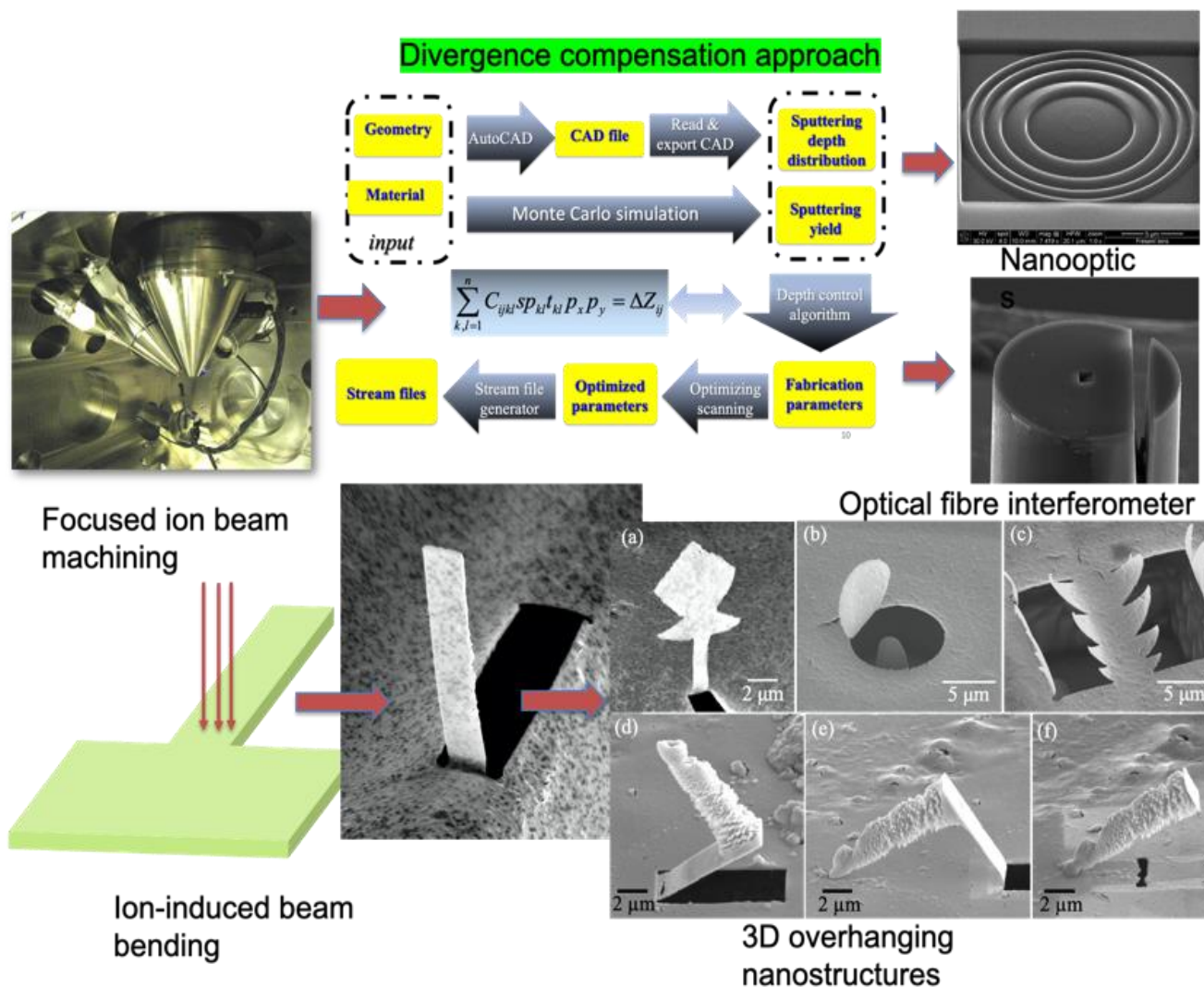
¹Centre for Precision Manufacturing, DMEM, University of Strathclyde, Glasgow, G1 1XQ, UK

²School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, EH14 1AS, UK

*Corresponding and Presenting Author. E-mail: xichun.luo@strath.ac.uk

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Graphical Abstract



Abstract

This talk highlights the research & development of focused ion beam (FIB) techniques for micro and nano structuring novel mechanical and optical devices. It presents a deterministic FIB fabrication approach with an effort to compensate the divergence errors associated with the FIB processing technique, such as beam overlap, angular dependence of the sputter yield and a level set approach to predict generated surface topography in consideration of the ion redeposition effects. It also presents a novel micro and nanostructuring approach based on FIB induced bending mechanism which is a very promising technique to create free standing micro/nano structure of desired shape for the next generation micro/nano devices. The talk will include several case studies including FIB polishing optical fibre interferometer and FIB nanostructuring single crystal diamond tools for scale up manufacturing of nano-gratings.

Keywords: Microstructures, nanostructures, focused ion beam, sputter yield, beam bending.

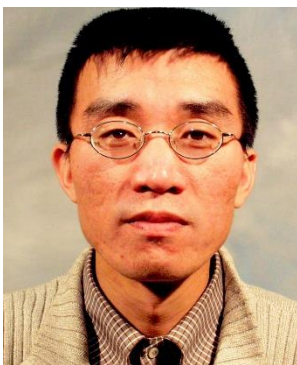
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Biography of Presenting Author



Xichun Luo is a Professor in ultra-precision manufacturing and technical director of Centre for Precision Manufacturing (CPM) at the University of Strathclyde (Glasgow). He is a Fellow of the International Society for Nanomanufacturing and an editor for Proceeding of IMechE Part C: Journal of Mechanical Engineering Science, Journal of Micromanufacturing and Mechanical Sciences. He also sits in the editorial board for Micromachines, Nanomanufacturing and Metrology. His research has been funded by the EPSRC, EC, Royal Society and Industry. His research interests include ultra-precision machining brittle materials, freeform machining, precision motion control, hybrid micromachining, FIB nanomanufacturing and digital manufacturing, as evidenced by two books and more than 120 papers in peer-reviewed highly ranked journals. He chaired two IEEE International Conferences in Automation and Computing in 2014 and 2015. He won UK Institution of Mechanical Engineers (IMechE) 2015 Ludwig Mond Prize for his work in the application of digital technology in micro- and nano-manufacturing.

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