



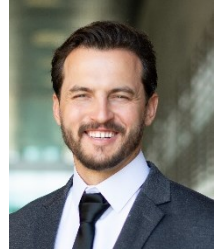
THE UNIVERSITY *of* EDINBURGH

School of Engineering

IMP seminar

13:00-14:00 on **13th June**

Sanderson Classroom 3



**Lithography metal manufacturing:
The next generation of metal 3D printing
Dr. Ruslan Melentiev (KAUST)**

ABSTRACT

Imagine an additive manufacturing (AM) technology capable of 3D printing any design in any metal directly to a net shape: no support removal, no platform detachment, no CNC machining, but a “print on shelf” path bypassing the costly and time consuming workshop postprocessing. This has recently become feasible with lithography metal manufacturing (LMM), a vat photopolymerization technology that uses digital light processing on metal-filled resin to 3D print “green” parts for further debinding and sintering in a furnace. In the past few years, major AM players, such as Lithoz, Admatec, and Autodesk have spun off startup companies producing LMM printers whose accuracy and preciseness intriguing even Swiss watchmakers. Collaborating with one of such startups, we successfully produced steel parts with the accuracy, roughness, and design complexity unachievable for powder bed systems, including assemblies of parts enclosed inside other parts, multiscale metamaterials, intricate chemical reactors, micro-heat sinks, and bioimplants on a decimeter scale all within a petite 10m² lab space used for the full production cycle from feedstock synthesis to the net shape parts.

Drawing up on our results and success of emerging 3D printing service providers employing LMM, such as MetShape GmbH, I believe that LAM can empower small businesses in competition with large manufacturers by ruling out the need for costly infrastructure further democratizing the manufacturing sector.

SPEAKER

Ruslan Melentiev studied manufacturing technologies at Odesa Polytechnic (BSc), Turin Polytechnic (MSc), University College Dublin (PhD), and KAUST (postdoc). He has received three Erasmus Mundus awards, Young Inventor award, and Science Foundation Ireland grant. He is the member of the International Academy of Engineering and Technology (AET) and Saudi Arabian Society for Composite Materials (SASCUM). He has first-authored over 30 publications in prestigious venues (CIRP, AM, VPP, MD, JMP), and 8 UA and US patents, commercialized with Saudi Basic Industries Corp, TOYOTA Motors, and several original equipment manufacturers in the US and India.

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