



NUCLEAR AMRC  
ADVANCED MANUFACTURING RESEARCH CENTRE

**CATAPULT**  
High Value Manufacturing



# Cryogenic machining

## High performance clean cooling for demanding applications

Thursday  
1 December  
2016

The Nuclear AMRC invites you to explore the state of the art in cryogenic and near-cryogenic machining processes for the most demanding industries.

Cryogenic cooling uses extremely cold gas or liquid to control the heat generated during machining. It can improve machining efficiency and increase tool life while minimising the risk of component failure.

Ultracold nitrogen or carbon dioxide can replace conventional oil-based coolants for many applications, and can potentially benefit processes which are usually run dry. They can reduce surface residual stress and thermal damage, and improve surface roughness. They can also reduce the need to clean components during production, reduce waste, and cut the environmental impact of machining.

Discover how innovative research is helping to bring cryogenic processes to market, see them in action on production-scale machines, and find out how your business could benefit from these exciting new technologies.

To register, or for more information:

 [cryomachining.eventbrite.co.uk](http://cryomachining.eventbrite.co.uk)

 [events@namrc.co.uk](mailto:events@namrc.co.uk)

 0114 222 9954

Venue: Nuclear AMRC, University of Sheffield,  
Advanced Manufacturing Park, Brunel Way, Rotherham, S60 5WG



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### Agenda

Thursday 1 December 2016

9.30	Registration, refreshments and networking
10.00	<b>Introduction and safety brief</b> Carl Hitchens, head of machining & metrology, Nuclear AMRC
10.15	<b>CO<sub>2</sub> cooling and cleaning – development and outlook</b> Jon Wikstrom, Cool Clean
10.45	<b>PVD coating, coolant and flow rate in titanium alloy milling</b> Dr Ibrahim Sadik, Sandvik Coromant
11.15	Refreshments
11.30	<b>CO<sub>2</sub> cryogenic machining of titanium alloy</b> Nikolaos Tapaglou, AMRC with Boeing
12.00	<b>Advanced cooling in machining processes</b> Dr Krystian Wika, Nuclear AMRC
12.30	Lunch and networking
13.15	<b>Demonstration of cryogenic machining capabilities</b> Delegates to split into groups
2.00	<b>Cryogenic machining: opportunities and gaps</b> Prof. Stephen Newman & Dr Alborz Shokrani, University of Bath
2.30	<b>Applying liquified nitrogen and CO<sub>2</sub> to the machining zone</b> Dr Franci Pušavec, RWTH Aachen University
3.00	Close of event

### Venue

Nuclear AMRC, University of Sheffield,  
Advanced Manufacturing Park, Brunel Way, Rotherham, S60 5WG

The AMRC campus is just off Sheffield Parkway (J33 M1) – follow signs to the Advanced Manufacturing Park, and aim for the large wind turbine.

Free parking is available in front of the Nuclear AMRC, or follow signs to the AMRC overflow carpark further up Brunel Way.

Satnav: please use the postcode S60 5TZ.

