

Metamaterials for Health

Dr Tom Allen FIMechE

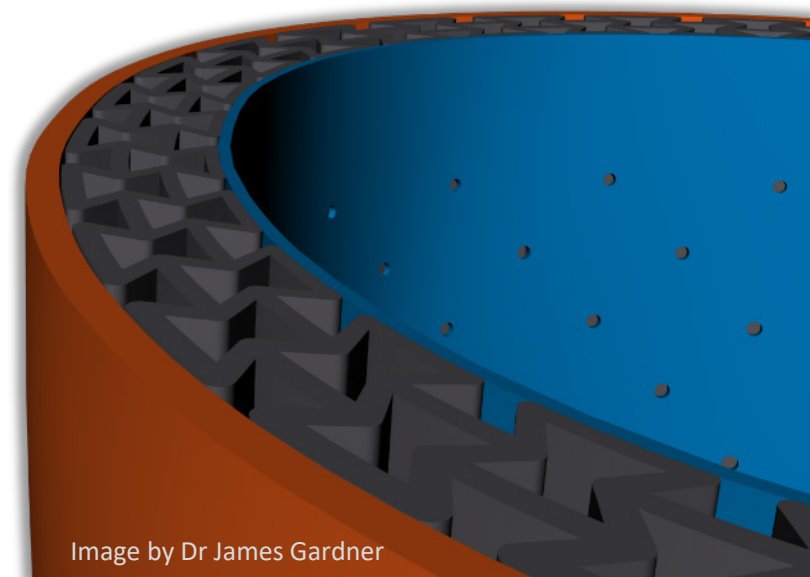



Image by Dr James Gardner

Aim

- build a vibrant and creative, multidisciplinary community to accelerate novel and innovative metamaterials research and exploitation pathways, while securing and building the UK's sovereign capability and prosperity in this crucial scientific area.

 <h2>Funding Streams</h2>				
	Access Fund Funding Stream 1	Discretionary Fund Funding Stream 2	Small Grants Funding Stream 3	Pump Prime Fund Funding Stream 4
Purpose	To enable attendance at NetworkPlus activities where financial barriers would otherwise limit member engagement.	To support strategic activities beyond those originally conceived to the benefit of the NetworkPlus' vision and objectives.	For activities, including: <ul style="list-style-type: none"> • access to facilities • consumables • Travel • bid-writing 	<ul style="list-style-type: none"> • Supporting growth, innovation and career advancement in metamaterials. • Enabling the development of new ideas, and original concepts to be tested. • Supporting the strategic priorities of the UKMMN+
Frequency	Event Based	Monthly	Monthly	Biannual till March 2026 .
Value	Need dependent	<=£2,500	<=£5,000	<=£50,000 (80% of FEC)
Application cycle	Integrated into event registration	Members propose to Executive Board (EB) members who sponsor ideas at EB monthly meeting	Open form reviewed monthly	Applications open on 1st Monday of October and March <ul style="list-style-type: none"> - Expression of Interest - Full proposal after shortlisting
Review Process	Email application to info@metmaterials.network . The questions will be available via the governance documents or through the inbox.	1. Executive Board via monthly review and vote	1. Executive Board via monthly review and vote	1. Assessment Panel review EOI and rank order submissions. 2. Executive Board confirm expected funding and work with applicants. 3. Assessment Panel review full submission and perform final rank ordering. 4. Executive Board confirm funding.

2024 STFC Cross Cluster Proof of Concept Grant



The Call

- Opportunity to claim up to £45k (match-funded) to fund business-led, proof-of-concept projects from any area related to the STFC-supported Clusters in Space, Energy, Health and Life Sciences, Quantum, Digital, and Defence and Security.

Purpose

- Stimulate collaboration with organisations in the clusters at Harwell and Sci-Tech Daresbury Campuses and facilitate access to national facilities.
- Help progress innovative ideas and demonstrate feasibility of technology, services or concepts.



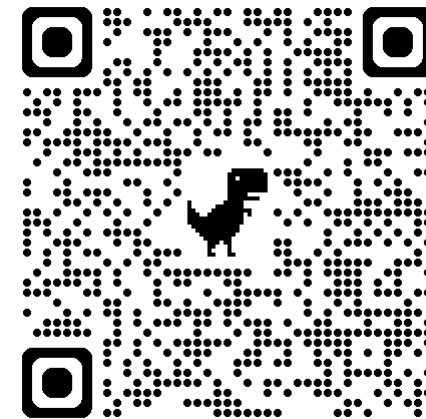
Has run
since 2017



Over £3m invested, leveraging
additional £3.2m in match
funding



Over 261 organisations
supported



Scan the QR or click [here](#) to sign-up to the CCPOC 2024 information webinar

Launch Date 4th September 2024
Closing Date 16th October 2024

Email

CrossClusterPOC@stfc.ac.uk
to request an application pack

Metamaterial

- 3D structure comprised of at least two different materials, with a response or function that impossible to achieve with any individual constituent material.

Metasurface

- 2D version of a metamaterial where the structural elements are confined to a 2D plane.

Metamaterials for Health



HEALTHY LIVING



HEALTHCARE



EXERCISE



WELLBEING



AGEING

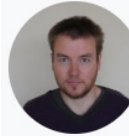


MONITORING &
DIAGNOSIS



THERAPEUTICS

Health Lead(s)



Tom Allen

Manchester Metropolitan
University



Rob Hewson

Imperial College London



Calum Williams

University of Exeter



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Health Challenge

Dr Tom Allen

Healthy living

Prof. Rob Hewson

Healthcare

Dr Calum Williams

Exercise

Olga Kravchenko

- Facilitating sport, exercise & physical activity
- Monitoring exercise & physical activity
- Active travel
- Injury risk reduction (PPE, footwear, equipment etc)
- Disabled sport
- Prehabilitation and rehabilitation

Wellbeing

Prof. Emma Hodson-Tole

- Work life balance
- Sleep
- Healthy eating / lifestyles
- Transcranial magnetic stimulation
- Mental health
- Pollution
- Living buildings / cities
- Fashion
- Assistive living and working
- Art

Ageing

Prof. Georges Limbert

- Falls / fall monitoring
- Exoskeletons
- Implants
- Facilitating independence
- Care in the community

Monitoring & diagnosis

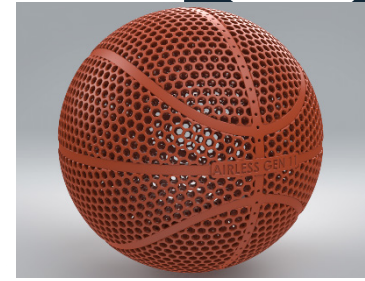
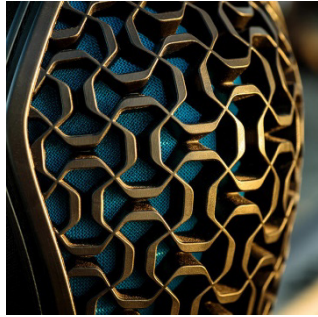
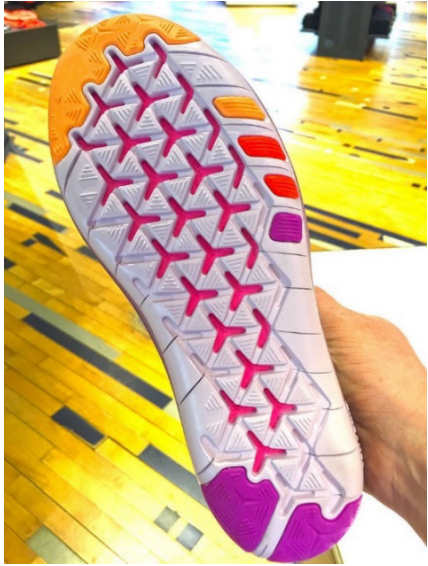
Mr Martin Leigh

- Patient monitoring
- Sensors and point-of-care testing
- Implantable bioelectronics and wearables
- Biomedical imaging and diagnostics
- Digital Health

Therapeutics

Dr Rupam Das

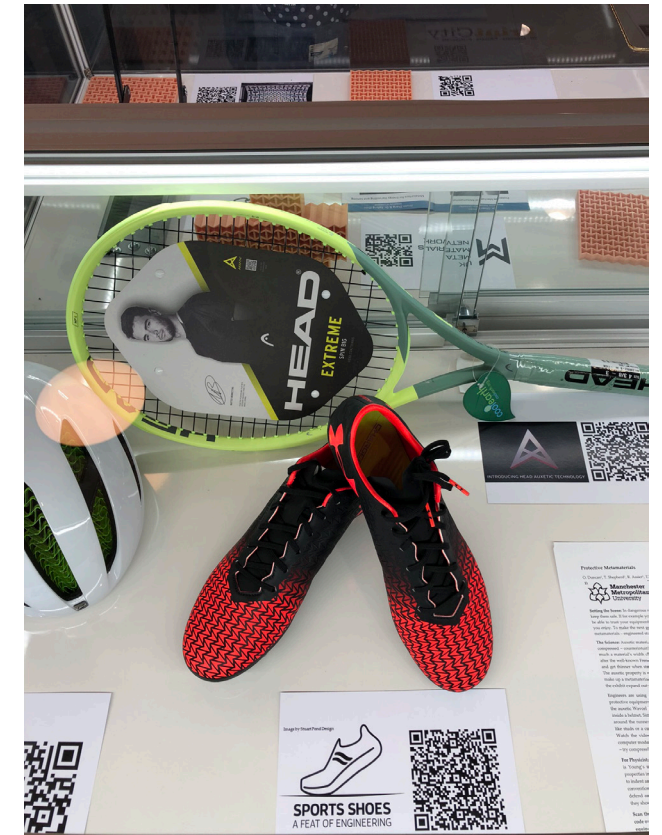
- Physical disability (prosthetics, orthotics & wheelchairs)
- Dentistry
- Trauma & first aid (wound healing, smart dressings / bandages, braces & splints)
- Rehabilitation
- Tissue engineering and scaffolds
- Target drug delivery and treatments
- Theranostics
- Photothermal therapy



UK META MATERIALS

AUXETIC









Smart Materials and Structures

TOPICAL REVIEW • OPEN ACCESS

Mechanical metamaterials for sports helmets: structural mechanics, design optimisation, and performance

Daniel Haid¹, Leon Foster¹ , John Hart¹, Richard Greenwald^{2,3}, Tom Allen⁴ , Pooya Sareh^{7,5,6}  and Olly Duncan⁴ 

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[Smart Materials and Structures](#), [Volume 32](#), [Number 11](#)

Citation Daniel Haid *et al* 2023 *Smart Mater. Struct.* **32** 113001

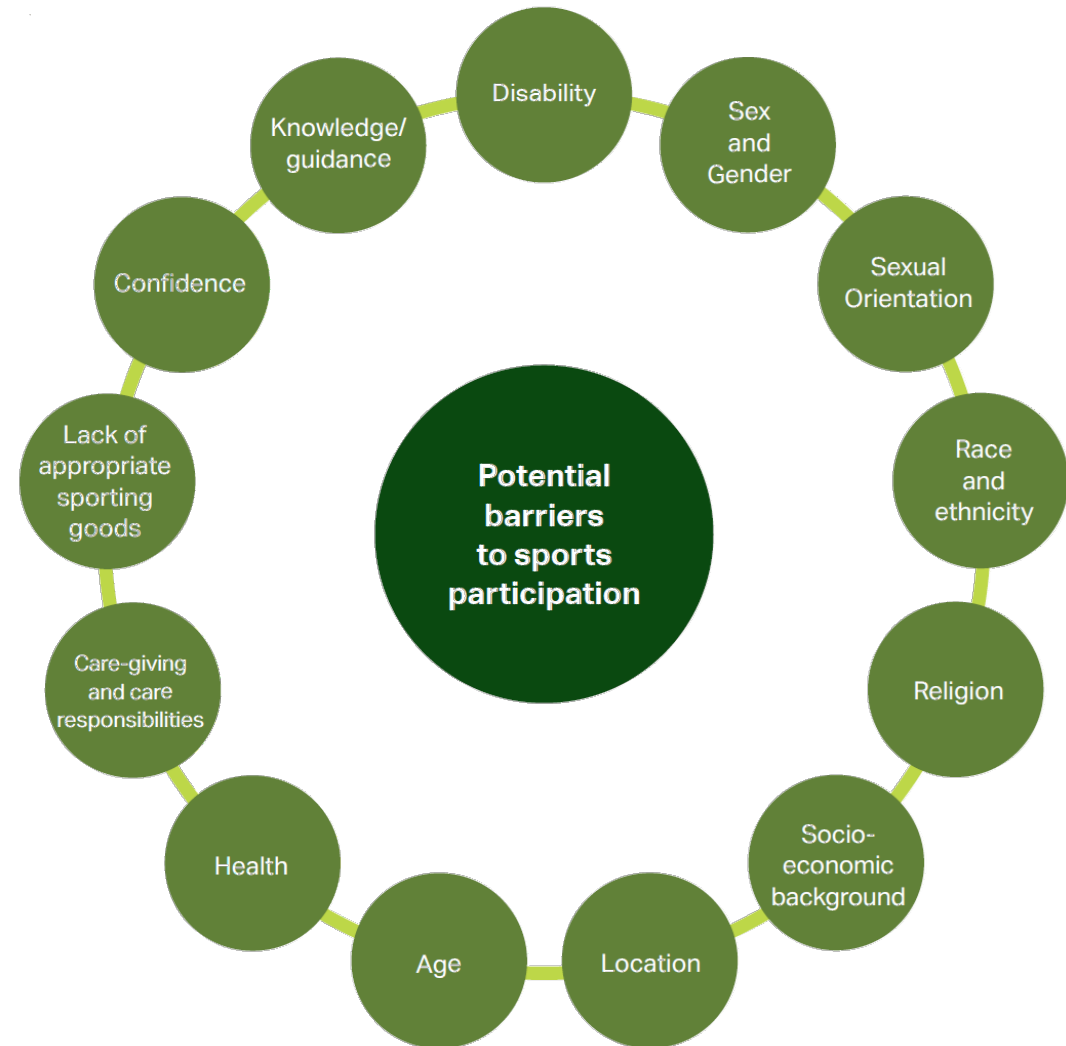
DOI [10.1088/1361-665X/acfd df](https://doi.org/10.1088/1361-665X/acfd df)

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Research

- Research community awareness
- Discovery
- Underpinning evidence

Validation

- Manufacturing scaleup
- Laboratory and clinical validation
- Public awareness

Vision

- Continuous health monitoring
- Customised health
- Prevention

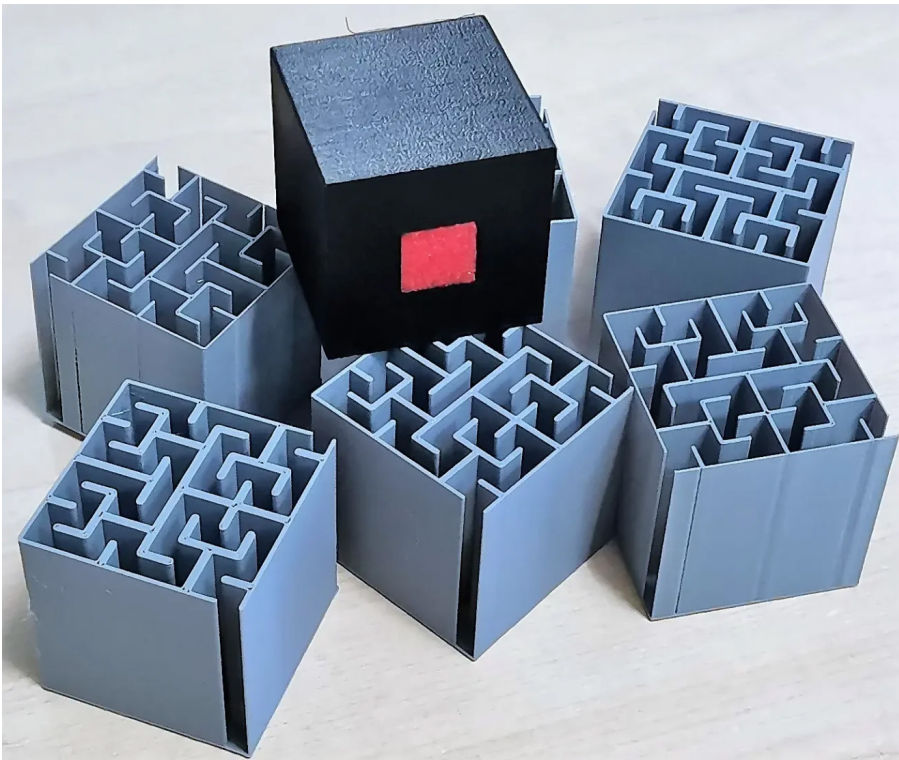


Image credit: Gianni Comandini



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June 2024

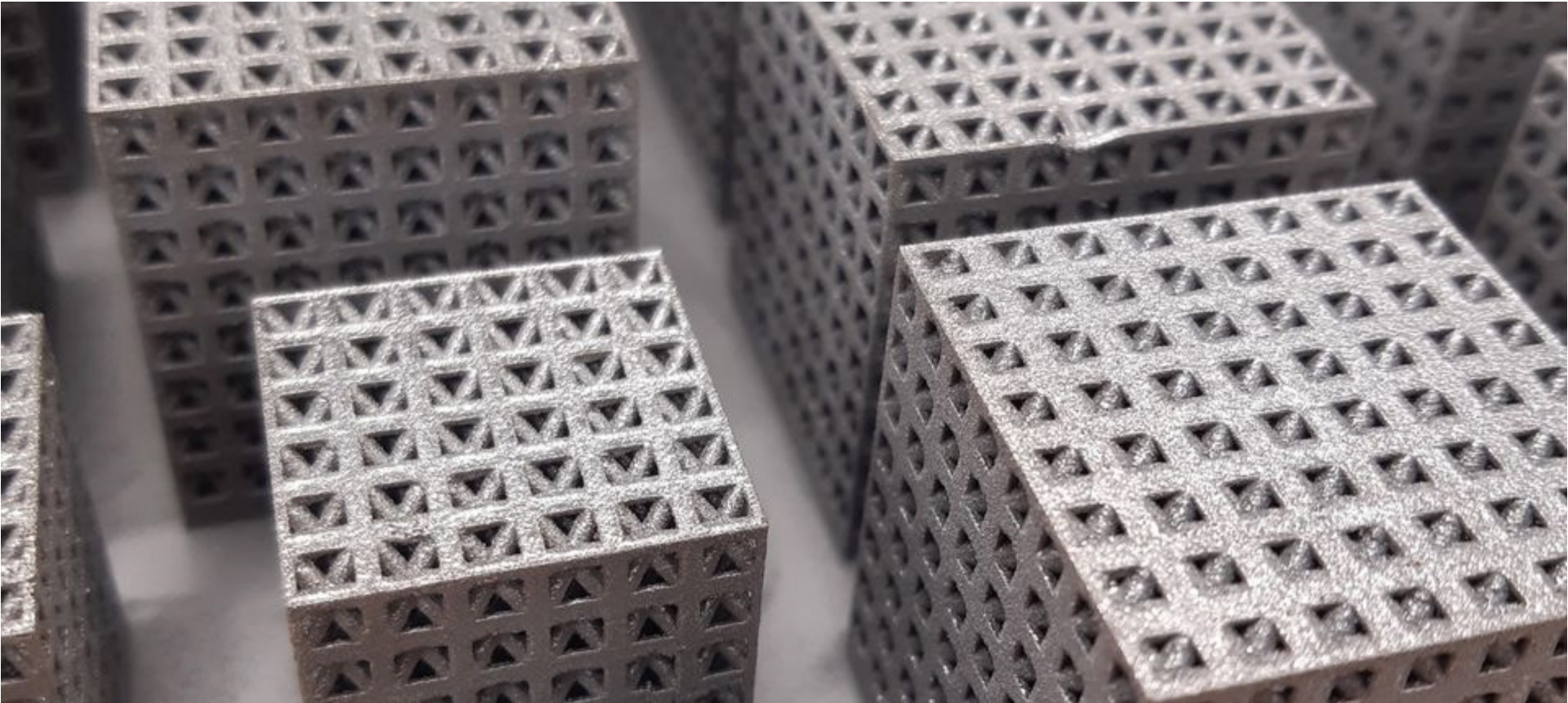
Sheffield Hallam, National Centre of
Excellence for Food Engineering (NCEFE)

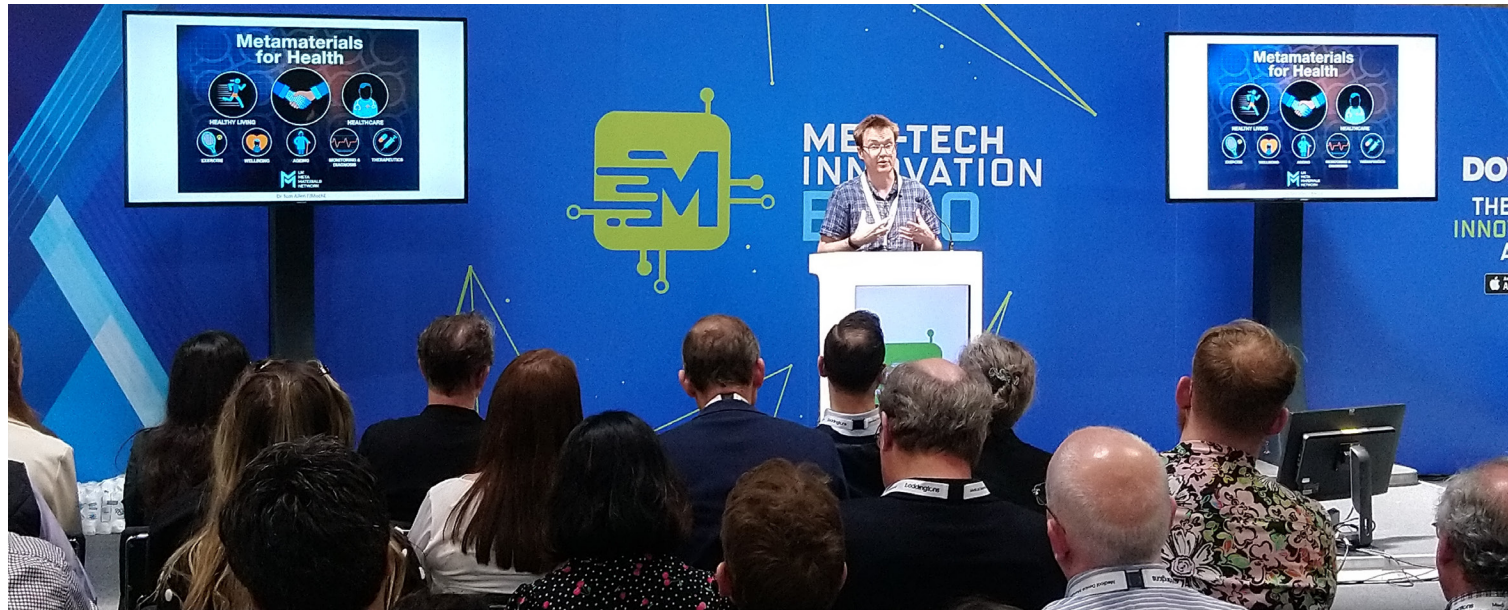


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Conference session on metamaterials in sports



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Topical Collection: Metamaterials in Sport

CALL FOR PAPERS | Submission deadline: 1 March 2025

Guest Editors: Oliver Duncan, Enrique Cuan-Urquizo, Gregory Chaplain, David Newman & Olga Kravchenko

Metamaterials research spans various domains, and in this collection, we hope to promote the application of more metamaterials in sports.



Thank you for listening.