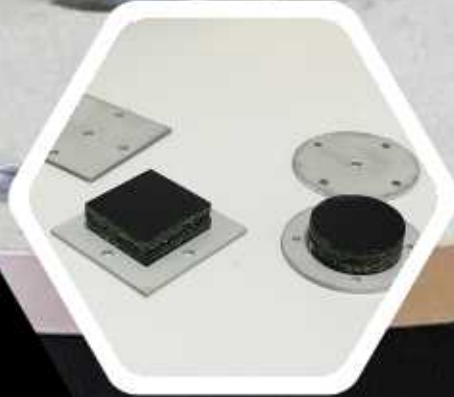


GREI
**Graphene Reinforced
Elastomeric Isolator**

Prof. Maria Rosaria Marsico
m.r.marsico@exeter.ac.uk



WORLD ECONOMIC FORUM

- 70% of the world's population will be living in cities by 2050



HM Government

A Green Future: Our 25 Year Plan to
Improve the Environment

- 2020: the UK Government strategies for new homes - 300k extra homes a year



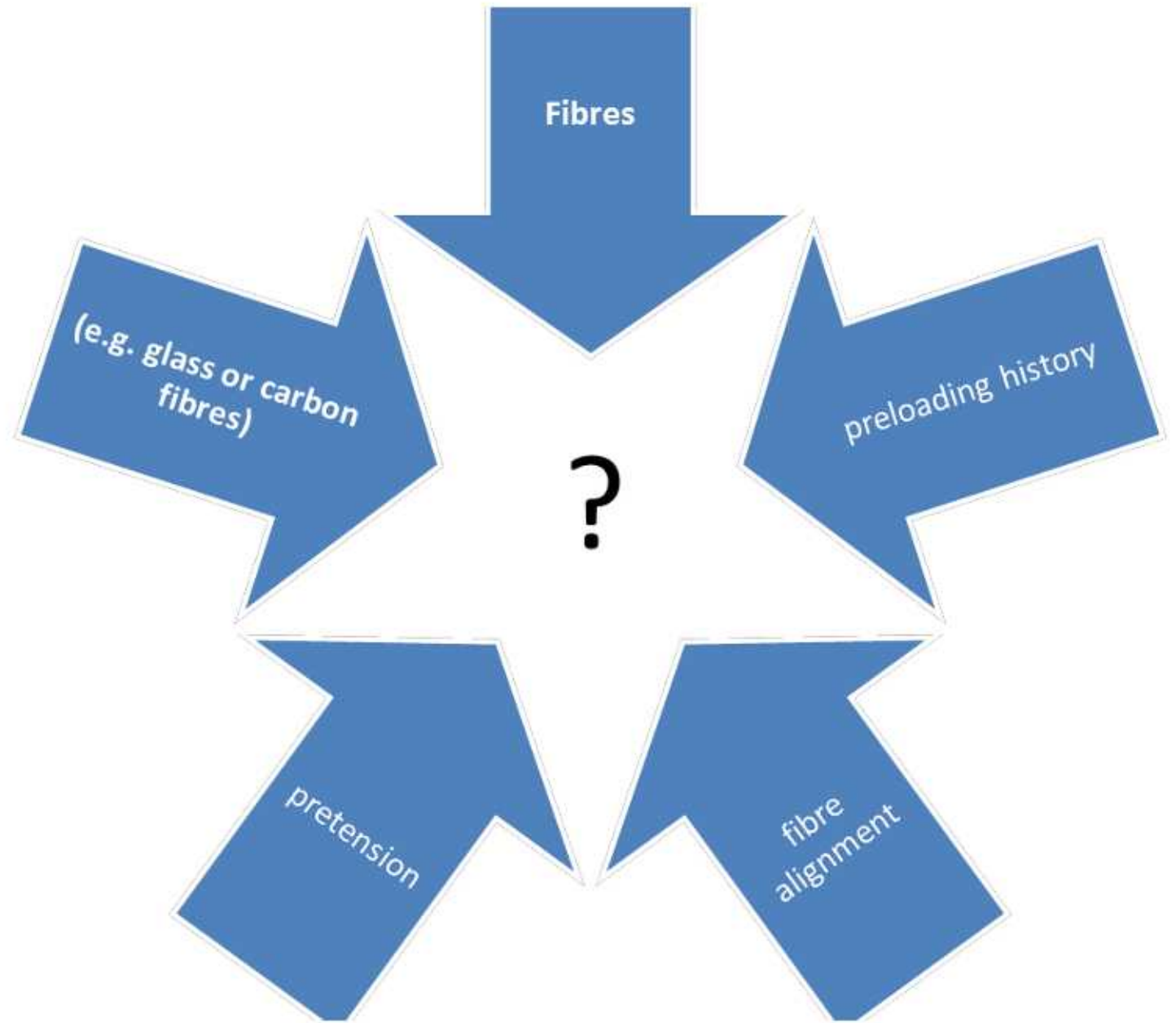


Elastomeric Isolators

- custom-made
- heavy
- costs for manufacturing, shipping, handling and installation
- corrosion and delamination

Reducing Carbon Footprint

Elastomeric Isolators reinforced with fibres

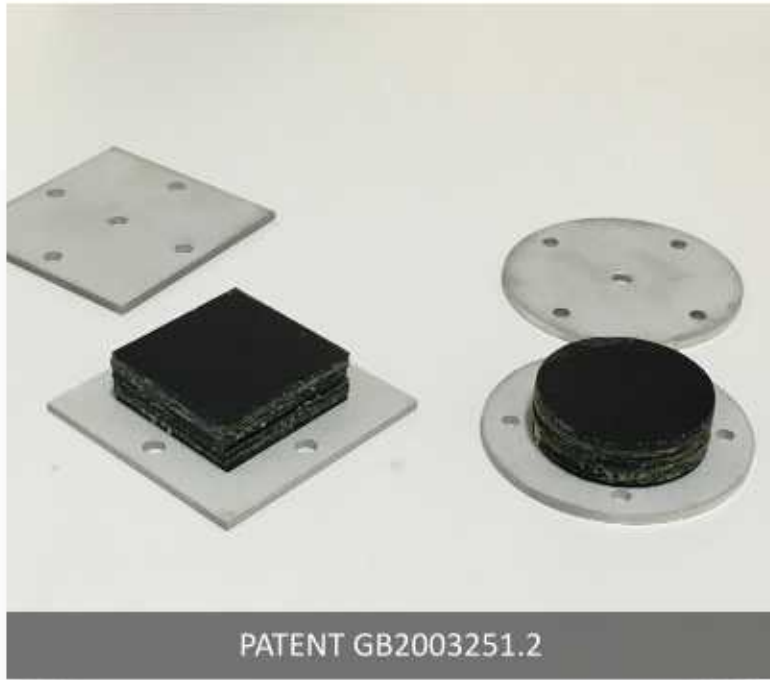




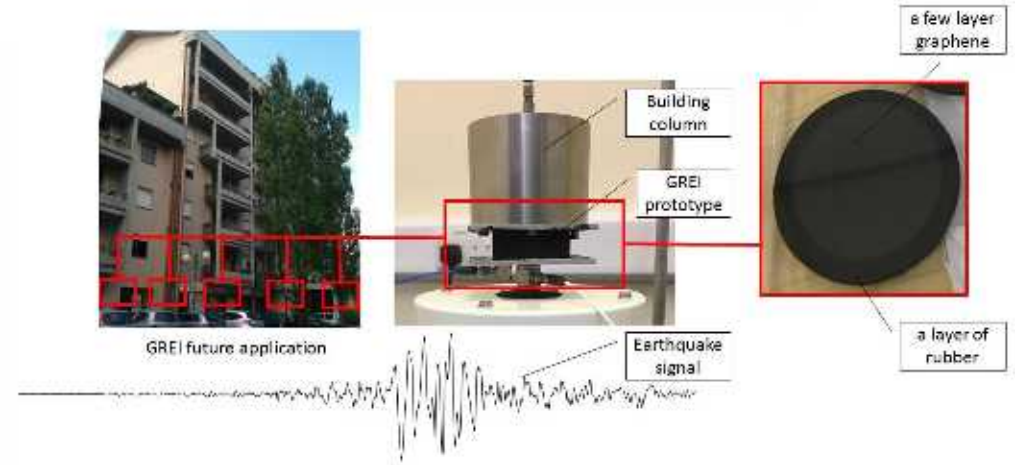
Graphene Reinforced Elastomeric Isolators (GREI)

An attractive alternative to using fibres to reinforce rubber is graphene.

Graphene, a one-atom thick layer of carbon, is one of the thinnest materials which can be conceived. It is the strongest known material, which is also mechanically flexible.



Our Solution



ARUP

SOM

LAING O'ROURKE



MASON UK LTD
Vibration Control Products
& Acoustic Floor Systems



DYNAMIC ISOLATION SYSTEMS

The World Leader In Seismic Isolation

Farrat

SI

SEISMIC
INTELLIGENCE

BREEAM®



NATIONAL
COMPOSITES
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NPL



Aberdeen Section

www.spe-uk.org

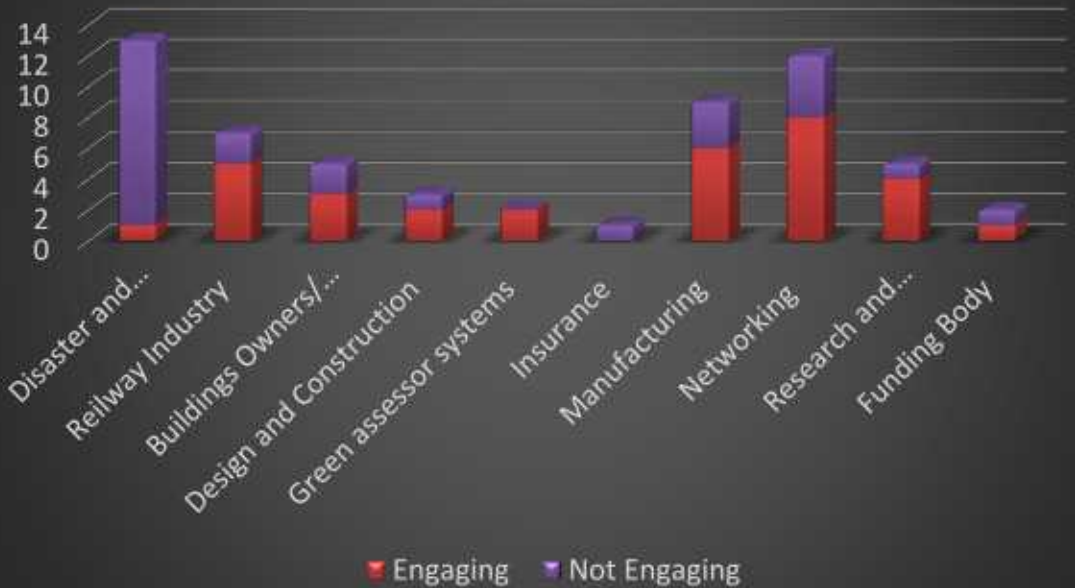


CONSTRUCTION
INNOVATION HUB

Stage 1
6 weeks

Stage 2
10 weeks

Market Search Stage 2



Prof. Maria Rosaria Marsico

Berkeley
UNIVERSITY OF CALIFORNIA



#NewEuropeanBauhaus



RECIRCLE



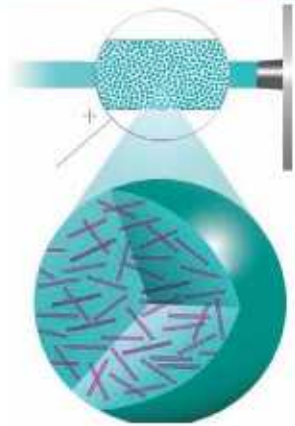
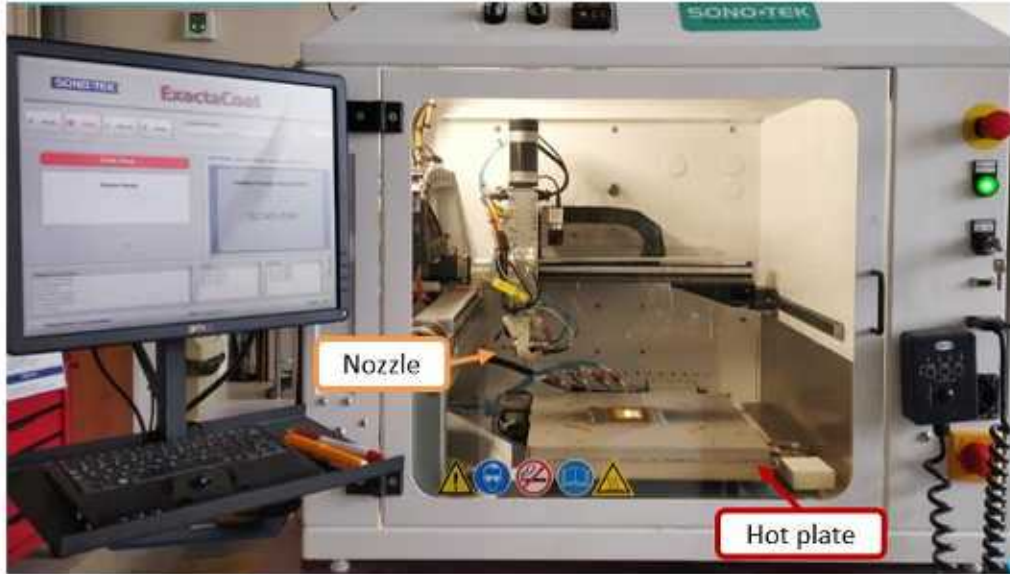
Our products are the only antivibration devices, easy to manufacture, transport and install, that will enhance resilience of structures, communities well being and preserve the environment.

GREI
Graphene Reinforced Elastomeric
Isolator

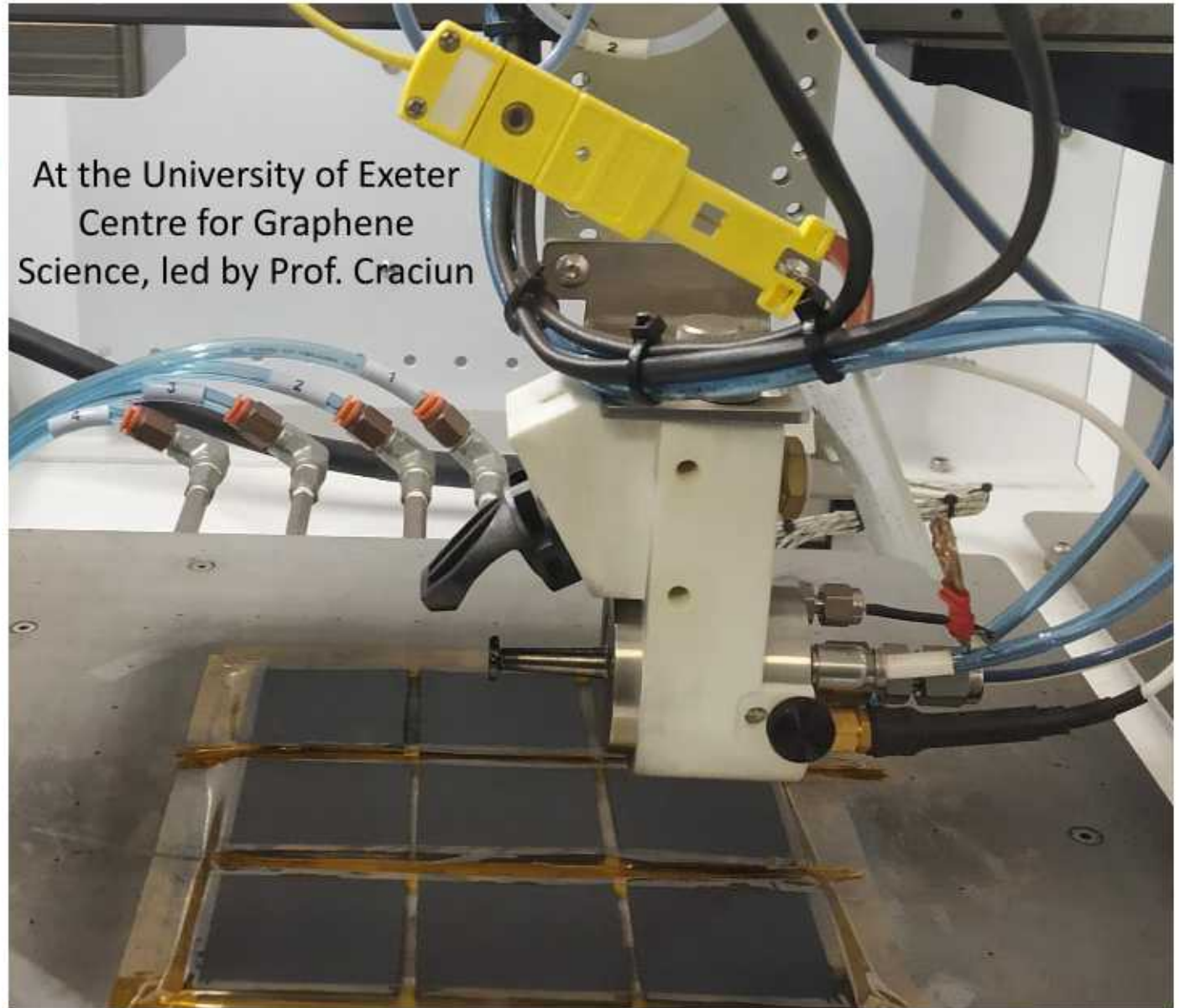


Graphene Manufacturing: printing

Ultrasonic spray coating

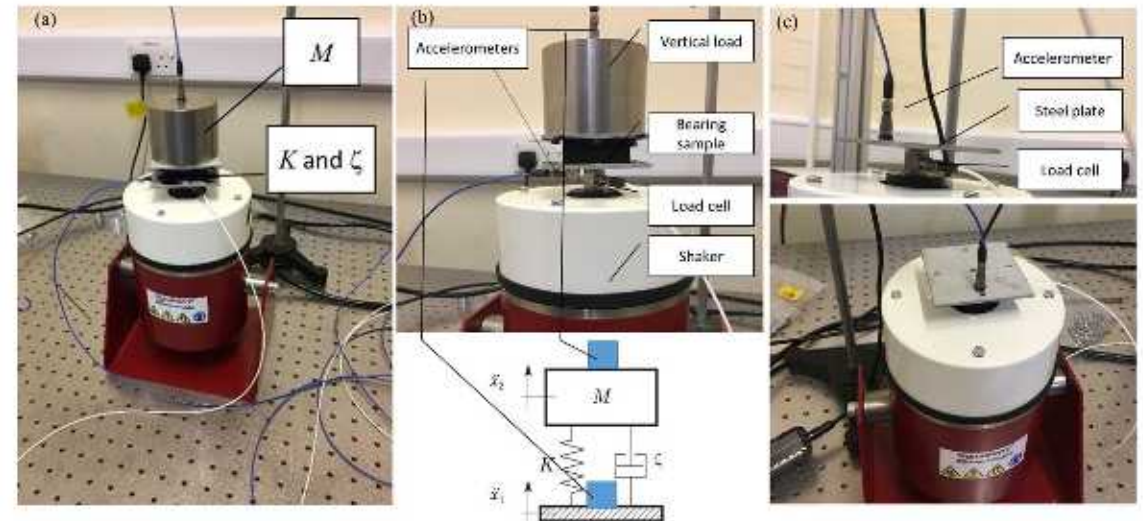
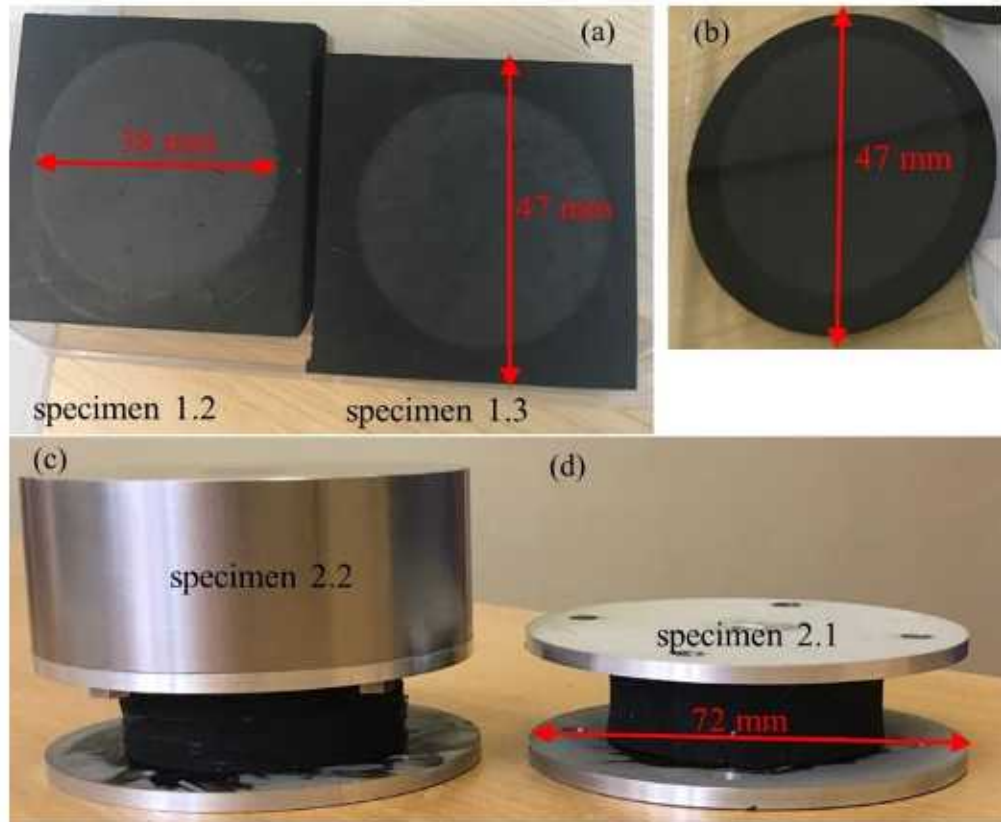


Graphene nanoplatelets are uniformly mixed by ultrasonic vibrations during spray



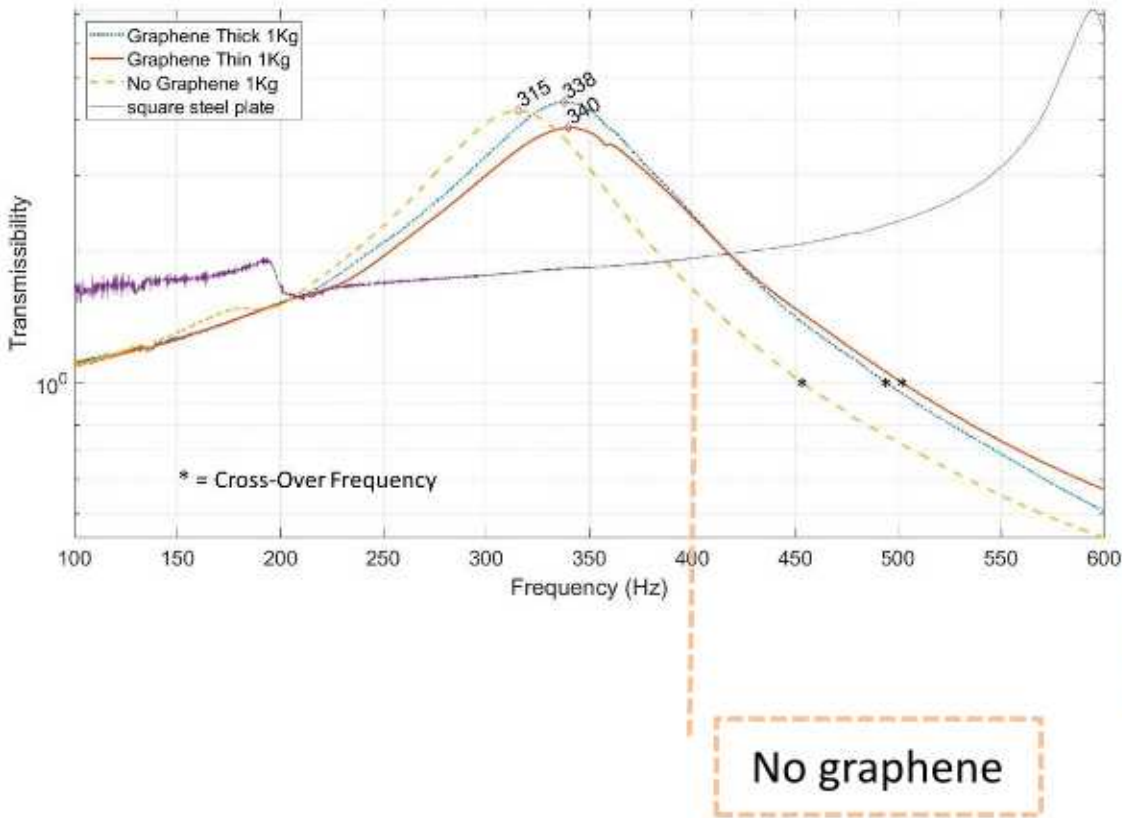
At the University of Exeter
Centre for Graphene
Science, led by Prof. Craciun

Specimens and experimental set up



At the University of Exeter
Dynamics Lab, led by Dr
Londono

Experimental results

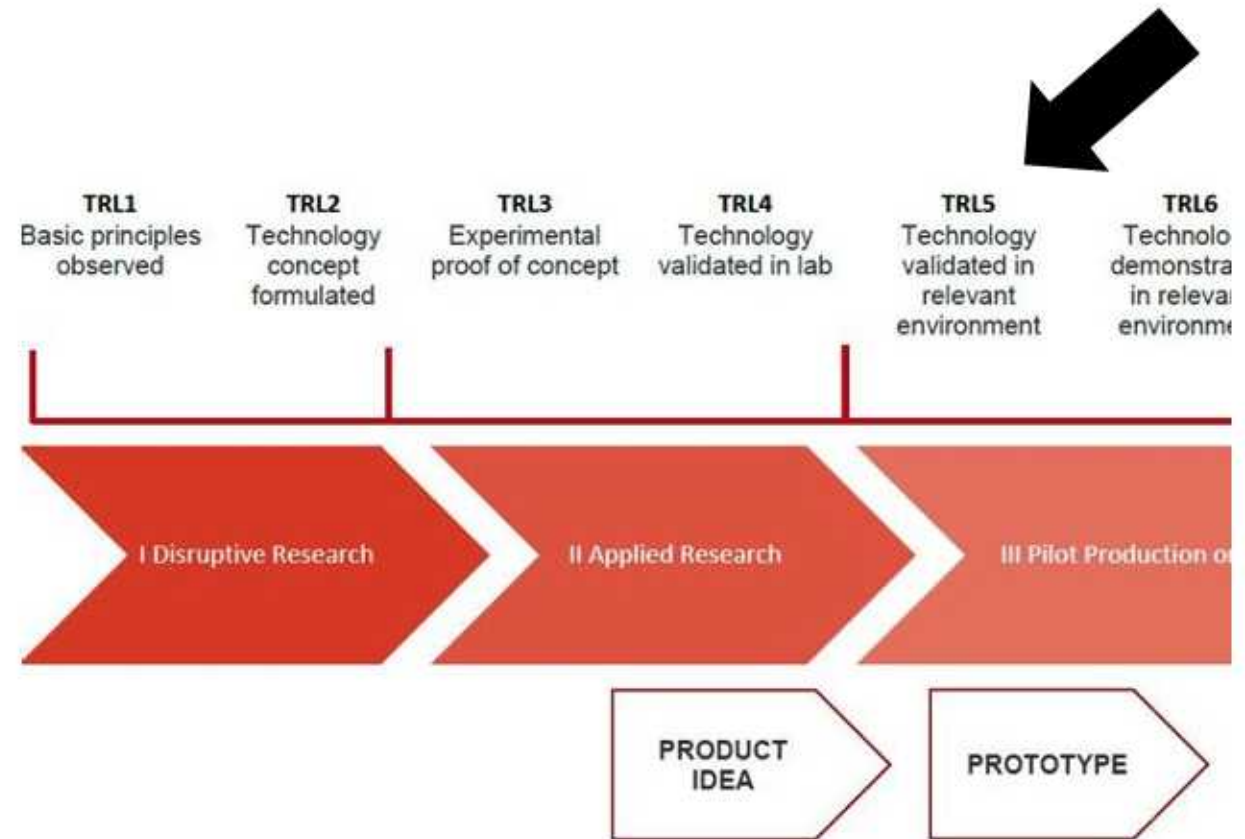


	Rubber Pad (specimen 1.1)	Rubber Pad + Graphene Thick* layer (specimen 1.2)	Rubber Pad + Graphene Thin* layer (specimen 1.3)
Natural Frequency f_n [Hz]	315	338	340
Cross-Over Frequency [Hz]	452	493	501
Damping factor ζ (Peak picking)	0.1236	0.1245	0.1455
Vertical Stiffness [N/m] (SDOF)	3942157	4510172	4590590
Increase Vertical Stiffness [%]	-	14.41	16.45
Instantaneous Compression Modulus E_c [N/m ²]	3.41E+07	3.90E+07	3.97E+07
LSRF method			
Natural Frequency f_n [Hz]	318	344	348
Damping factor ζ	0.1212	0.1233	0.1292

*Thick and Thin layers of graphene are produced by varying the quantity of graphene solution in water solvent.

What's next?

- Expanding the testing facilities at University of Exeter
- Recycled rubber industry (Net Zero)



<https://redknightconsultancy.co.uk/an-introduction-to-technology-readiness-levels-trl/>

Testimonials

“As I mentioned, Ruben and I would be happy collaborating with you in your research and development. We see a huge potential in your devices” from Seismic Intelligence

“Regarding your research, I think this is an excellent subject for our group. Would you be willing to give a presentation to us” from SOM

“I was really interested in your work with rubber/graphene bearings (I'm a rubber technologist who has been involved in this area before)” from RECIRCLE

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