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JOINT POC202015



Biotechnology and
Biological Sciences
Research Council



Engineering and
Physical Sciences
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Fibre Highways: translocation of the microbiome for pollutant bioremediation

"The support that the EBNet PoC Award provided us really was very useful to both mine and Jane's research careers as ECR's forging independent careers in new roles at new institutions at the time of the award. We've successfully navigated the challenges of not really speaking each other's languages in the beginning to producing interdisciplinary research outputs, which we're both very proud of and we continue to work closely together. The Award continues to act as a springboard and has led to further discussions within academia and industry, enabling us to secure further funding and employ researchers to go on to explore new avenues around the original PoC research ideas."

Dr Angela Sherry

Project aim and results

The research combined expertise in environmental molecular microbiology and material and textile science to demonstrate translocation of the microbiome along 'fungal or fibre highways' to facilitate pollutant biodegradation.

Demonstrating the directional movement and dispersal of microbes on a range of natural and synthetic fibres achieved a deeper understanding of the interactive dynamics of motility in hydrocarbon-degrading multispecies microbiomes along fungal mycelium and natural/ synthetic fibres, with multiple potential areas of application such as the bioremediation of environmental pollutants.

The study hoped ultimately to lead to the development of environmentally responsive textile systems composed of natural and sustainable material that could be used to e.g. increase the contact time of microbes with the pollutant for more efficient bioremediation or 'seed' polluted sites.

Impact

The Fibre Highways design collection was exhibited at the prestigious *12th International Design Biennale St Etienne*. Dr Jane Scott was lead co-ordinator and organiser of 3-day hybrid event *ARCINTEX Symposium*. Since the funding ended, the research has continued to evolve, and funding was secured to jointly supervise a Research Assistant in microbial-textile interactions at Northumbria University.

The Award assisted in meeting probationary requirements for Dr Angela Sherry to transition from Vice Chancellors Fellow to *Assistant Professor* in Microbial Environments at Northumbria University.

Other funding

Enzymatic upcycling of textile waste into biodegradable mycelium leather, PI Dr Paul James, Co-I Dr Jane Scott. Northumbria University. £303,297. Feb 2023 - 2025. BBSRC. BB/X01133X/1

Fibre Fusion: Circular Manufacturing of Water Repelling Bacterial Cellulose Through a Biological Approach. PI Dr Meng Zhang, Co-I Dr Jane Scott. Northumbria University. £302,929. Feb 2023 - 2025. BBSRC. BB/X011402/1

FURTHER REFERENCES:

Biohybrids: Textile fibres provide scaffolds and highways for microbial translocation. By: Angela Sherry, Bruna Martins Dell'Agnese & Jane Scott. *Front. Bioeng. Biotechnol.*, 13 June 2023 *Sec. Biomaterials Volume 11 – 2023*

BioKnit: development of mycelium paste for use with permanent textile formwork. By: Romy Kaiser, Ben Bridgens, Elise Elsacker & Jane Scott. *Front. Bioeng. Biotechnol.*, 14 July 2023 *Sec. Biomaterials Volume 11 - 2023*

