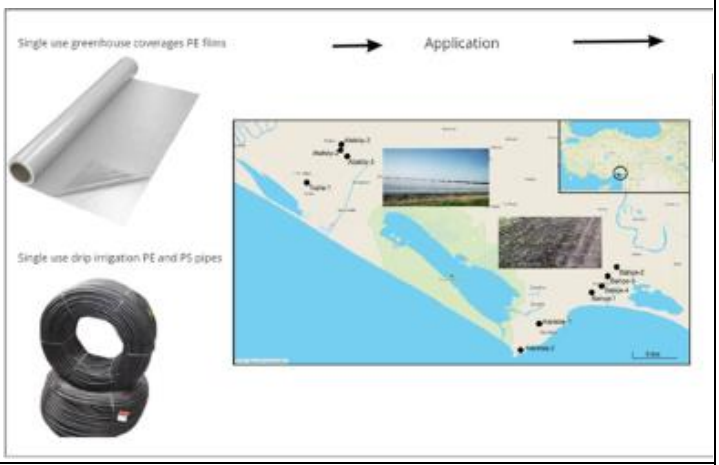
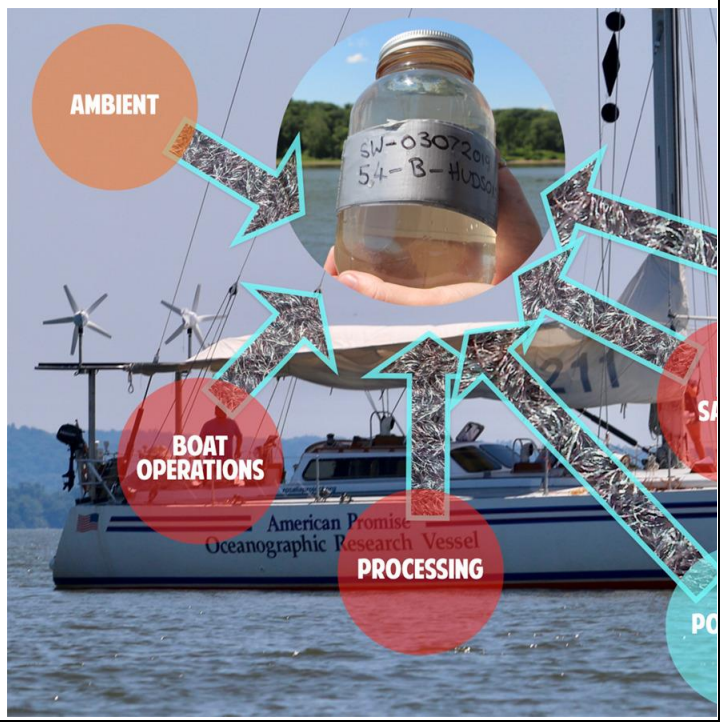
CCJS Microplastics Research

Articles:

Title	Link/Reference	Abstract/Graphical abstract
The transport and fate of microplastic fibres in the Antarctic: The role of multiple global processes	Cunningham, M., Rico Seijo, N., Altieri, K., Audh, R., Burger, J., Bornman, T., Fawcett, S., Gwinnett, C., Osborne, A., & Woodall, L. (2022). The transport and fate of microplastic fibres in the Antarctic: The role of multiple global processes. Frontiers in Marine Science, 9.: https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2022.1056081/full	Understanding how microplastics move and accumulate is essential to assessing their impact on global biodiversity. Since pinpointing the exact sources of microplastics is challenging, studying the remote and minimally polluted Antarctic Weddell Sea can provide valuable insights. Researchers investigated the presence of microplastics in the Antarctic's air, seawater, and sediment. They hypothesized that various transportation methods, such as air and ocean currents, carry microplastics to the region. Using advanced techniques, they identified 47 different microplastic categories, mainly fibres. Most categories were unique to a single medium, but some were found in multiple media, indicating diverse sources and transportation pathways. Air Mass Back Trajectory analyses showed that microplastic fibres likely travel to the Antarctic from southern South America via wind. The study also suggested that fibres might be transported through subsurface waters. Pollution in sediment and sea ice samples indicates that the Antarctic coastal and deep-sea areas could be accumulating these fibres. The findings from this remote and largely pristine area underscore the urgency of addressing global plastic pollution.
Plastics derived from disposable greenhouse plastic films and irrigation	Gündoğdu, Rezan & Önder, Derya & Gündoğdu, Sedat & Gwinnett, Claire. (2022). Plastics Derived From	Plastic is everywhere, used in various activities from farming to packaging and construction. This study looked at the amount and types of plastics in agricultural soil in Adana/Karataş, Turkey, where plastic films and irrigation pipes are commonly used. Soil samples from 10 locations showed an average of

pipes in agricultural soils: a case study from Turkey	Disposable Greenhouse Plastic Films and Irrigation Pipes: A Case Study From Turkey. 10.21203/rs.3.rs-1282764/v1 : https://link.springer.com/article/10.1007/s11356-022-21911-6	16.5 pieces of plastic per kilogram. The Bahçe-4 location had the most plastic (39.7 pieces/kg), while Karataş-1 had the least (0.7 pieces/kg). The average plastic size was about 18 mm. Plastics from greenhouse covers were around 19 mm, and those from irrigation pipes were about 12.5 mm. The plastics were categorized as microplastics (41.9%), meso plastics (36.3%), macro plastics (16.3%), and mega plastics (5.6%). The study found that removing used plastics from fields reduces the amount left in the soil. However, a significant amount of plastic still remains in agricultural soil. 
Alternatives to petroleum-based plastics as a potential solution to the global plastic pollution crisis in marine environments: Do they provide sustainable solutions?	Gündoğdu, S., Walker, T. R., Almroth, B. C., Coffin, S., & Gwinnett, C. (2022). Alternatives to petroleum-based plastics as a potential solution to the global plastic pollution crisis in marine environments: Do they provide sustainable solutions?. Frontiers in Marine Science, 9, 1066113.:	This editorial piece outlines key pieces of research on alternatives to petroleum-based plastics and evaluates their use in society. 

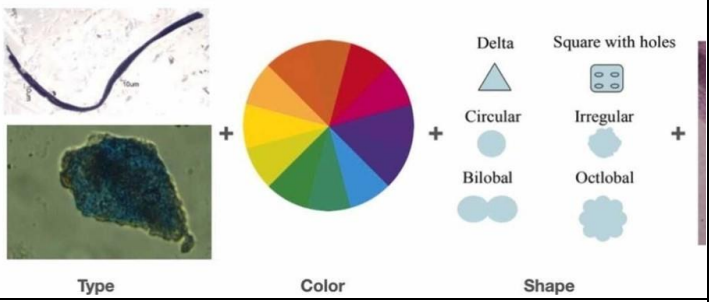
	https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2022.1066113/full	**Figure 1** Word cloud generated from the keywords from the five papers contributed toward this *Frontiers in Marine Science* Research Topic [generated through WordArt.com - Word Cloud Art Creator].
Are we contaminating our samples? A preliminary study to investigate procedural contamination during field sampling and processing for microplastic and anthropogenic microparticles	Gwinnett, C and Miller RZ (2021) Are We Contaminating Our Samples? A Preliminary Study to Investigate Procedural Contamination During Field Sampling and Processing for Microplastic and Anthropogenic Microparticles. Marine Pollution Bulletin, Volume 173, Part B : https://www.sciencedirect.com/science/article/pii/S0025326X21011292	Since 2004, methods for sampling and analysing microplastics in fresh and saltwater have improved, but reducing and monitoring contamination during these processes is still challenging. This pilot study looked at how much contamination is introduced into water samples during collection and analysis, with and without strict anti-contamination protocols. When rigorous protocols were followed, 33.8% of the microfibers and microplastics in the samples were from contamination. Without these protocols, contamination jumped to 70.7%. By thoroughly analysing samples and controls, the study identified crew clothing as a major contamination source. Recommendations were made for better anti-contamination practices and protocols to reduce contamination in future microplastic sampling from shorelines and small to medium-sized vessels. 

The application of tape lifting for microplastic pollution monitoring	Gwinnett, C, Osborne,A, Jackson, A, (2021) The application of tape lifting for microplastic pollution monitoring, Environmental Advances,100066, ISSN 2666-7657, https://doi.org/10.1016/j.envadv.2021.100066.	Microplastics (MPs) are tiny plastic particles, ranging from 1 micrometre to 5 millimetres, found in all environments on Earth. Typically, researchers isolate MPs from water or other media using filtration, then analyse them for size and type. However, this method can lead to accidental loss of particles and contamination, and hand-picking MPs from filters is time-consuming. This paper introduces a better workflow using a forensic technique called tape lifting. This method employs self-adhesive tape (Easylift®) to collect particles, which are then held between the tape and a glass sheet. Tape lifting saves time, allows for more samples, secures the particles, and preserves them for future study. In tests, the tape lifting method showed a high recovery rate of 96.4% for MPs from filters, with some variation depending on filter and funnel types. Recovery from water to filter papers was also high at 92.1%, unaffected by filter or funnel types. Easylift® is compatible with various non-destructive analysis techniques like polarized light microscopy, Raman spectroscopy, and fluorescence microscopy. This compatibility allows for detailed analysis of MPs, helping identify their sources and understand their potential environmental impacts.
Five things to consider about glitter this Christmas	GWINNETT, C., (2017) Five things to consider about glitter this Christmas. *The Conversation*. Available at: https://theconversation.com/five-things-to-consider-about-glitter-this-christmas-89519 [Accessed 3 July 2024].	Does glitter bring to mind the prospect of shiny, sparkly, Christmassy, harmless fun? I'm afraid it is a bit more complicated than that. The popularity of glitter and the sheer volume used at Christmas presents us with a growing problem. This article provides reasons to rethink your glitter habit.

Tax plastic takeaway boxes: the scourge of the oceans	GWINNETT, C., (2017) Tax plastic takeaway boxes: the scourge of the oceans. *The Conversation*. Available at: https://theconversation.com/tax-plastic-takeaway-boxes-the-scourge-of-the-oceans-87818 [Accessed 3 July 2024].	That takeaway box that was in your hands for 10 minutes on Friday night could be in the ocean forever. Single use plastics are a real concern for the planet. The use and throwaway nature of items such as food packaging and drinks bottles means that millions of tons of plastic waste are created. Unfortunately, much of this can enter waterways and oceans. This articles discusses how takeaway packaging contributes to plastic pollution in our oceans.
The major source of ocean plastic pollution you've probably never heard of	GWINNETT, C., (2019) The major source of ocean plastic pollution you've probably never heard of. *The Conversation*. Available at: https://theconversation.com/the-major-source-of-ocean-plastic-pollution-youve-probably-never-heard-of-111687 [Accessed 3 July 2024].	"Nurdles" may sound cute but they pose a huge risk to the marine environment. Also known as "mermaid tears", these small plastic pellets are a feedstock in the plastic industry. Instead of being converted into household items, many end up in the ocean, collecting toxins on their surfaces and being eaten by marine wildlife. Not so cute now, are they? This article discusses the issues surrounding nurdles and the micro plastic problem.
How your car sheds microplastics into the ocean thousands of miles away	GWINNETT, C., (2020) How your car sheds microplastics into the ocean thousands of miles away. *The Conversation*. Available at: https://theconversation.com/how-your-car-sheds-microplastics-into-the-ocean-thousands-of-miles-	The impact of car travel on the environment is well known. Exhaust emissions pollute the atmosphere with gases that raise global temperatures and make the air less safe to breathe. Sadly, the problems don't end there. Scientists have been studying another problem – and one that connects your daily commute to the most remote stretches of the world's oceans. This Conversation piece discusses how your car is contributing to the microplastic problem.

	away-142614 [Accessed 3 July 2024].	
Sampling microplastics for Environmental Forensic applications	GWINNETT, Claire, HARRISON, Eleanor, OSBORNE, Amy, Pivato, Alberto and Varghese, George (2021) Environmental Forensic: Sampling microplastics for Environmental Forensic applications. Detritus, 14. I-III. ISSN 2611-4135 : https://eprints.staffs.ac.uk/6881/1/DETRITUS%2014-2021_pages%20I-III_Environmental%20forensic%20(1).pdf	This article discusses the use of microplastic in forensic science applications.
The effects of polyester microfibres on the development and seed yield of white mustard (Sinapis alba L.)	Harrison, E. G., Reiling, K., Halfpenny, R. K., & Gwinnett, C. (2024). The effects of polyester microfibres on the development and seed yield of white mustard (Sinapis alba L.). Frontiers in Environmental Science, 12, 1310310. : https://doi.org/10.3389/fenvs.2024.1310310	Microplastics, especially microfibres, are commonly found in agricultural soils worldwide. However, their effects on crop growth and development are not well understood. Microfibres can enter agricultural soils through various means, such as soil amendments, wastewater irrigation, and atmospheric deposition, making these soils a significant reservoir for plastics. This study focused on the impact of polyester microfibres, a prevalent type of microplastic, on the growth and seed yield of white mustard (Sinapis alba). Polyester microfibres were added to soil at concentrations of 0.1% and 1% to simulate real-world exposure levels. Researchers assessed flower production, seed yield, pod-to-seed ratio, and chlorophyll fluorescence as measures of plant health. The findings showed that polyester microfibres significantly affected plant health. Chlorophyll fluorescence values changed, flower production decreased (with fewer flowers in treated soils

		compared to control), and the pod-to-seed ratio dropped. Specifically, the control group had an average of 74 flowers, while the 0.1% and 1% treatments had 31 and 44 flowers, respectively. The pod-to-seed ratio also decreased from 3.5 seeds per pod in the control to around 2.8 seeds per pod in the treated soils. This study indicates that polyester microfibres can stress plants, leading to reduced flower production and seed yield. Further research is needed to understand the exact mechanisms behind these changes.
Plastic Pollution, Waste Management Issues, and Circular Economy Opportunities in Rural Communities	Mihai, F.-C.; Gündoğdu, S.; Markley, L.A.; Olivelli, A.; Khan, F.R.; Gwinnett, C.; Gutberlet, J.; Reyna-Bensusan, N.; Llanquileo-Melgarejo, P.; Meidiana, C.; Elagroudy, S.; Ishchenko, V.; Penney, S.; Lenkiewicz, Z.; Molinos-Senante, M. (2022) Plastic Pollution, Waste Management Issues, and Circular Economy Opportunities in Rural Communities. Sustainability, 14, 20. https://doi.org/10.3390/su14010020	Rural areas suffer from severe pollution due to industrial and agricultural activities and poor waste management, making it difficult to meet the UN's Sustainable Development Goals (SDGs). These communities both contribute to and are impacted by plastic pollution, which affects air, water, soil, and wildlife.Despite increasing interest in plastic pollution, there's limited research on rural areas. This paper highlights the need for more studies on rural plastic pollution and waste management, focusing on the impact of plastic pollution on rural communities, the pollution generated by these communities, developing waste management in low- and middle-income countries in line with the SDGs, opportunities for a circular economy to reduce plastic pollution. Involving rural communities in research and decision-making is crucial to reduce environmental and health risks and promote circular economy initiatives, especially in less developed regions.
Microplastic and anthropogenic microfiber pollution in the surface waters	Miller, R. Z., Winslow, B., Kapp, K., Osborne, A., & Gwinnett, C. (2024). Microplastic and anthropogenic	This pilot study investigated the amount of microplastics and microfibers in the East River and Long Island Sound (LIS), USA, to pinpoint pollution hotspots. Samples were collected every 3 miles from Greenpoint, Brooklyn, through the middle of LIS to where it meets Rhode Island Sound. Results showed

of the East River and Long Island Sound, USA	microfiber pollution in the surface waters of the East River and Long Island Sound, USA. Regional Studies in Marine Science, 70, 103360 : https://doi.org/10.1016/j.rsma.2023.103360	that 97% of the samples contained man-made particles, with 76.14% being fibres and 23.86% fragments. Of the fibres, 47.76% were synthetic and 52.24% were non-synthetic. Four hotspots were identified, two primary and two secondary, near both ends of the sampling area. Researchers also analysed the particles by type, colour, shape, material, and other characteristics, identifying 30 potential sources of microparticle pollution.  
Did We Detect All the Microplastics? The Value of Including Polarized Light Microscopy in the Search Process	Osborne, A. O., Jackson, A. R., & Gwinnett, C. Did We Detect All the Microplastics? The Value of Including Polarized Light Microscopy in the Search Process. The Value of Including Polarized Light Microscopy in the Search Process: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4482444	Detecting microparticulate pollutants in the environment requires effective methods. This study explored whether adding polarized light microscopy (PLM) to stereomicroscopy improves detection. Results showed a significant increase in microparticle detection—41% more pollutants were found using both techniques compared to stereomicroscopy alone. PLM makes most microparticles appear bright against a dark background, which helps spot colourless particles that might otherwise be missed. Most of the additional particles found were colourless. The study recommends using PLM, either alongside stereomicroscopy or on its own, to enhance the detection of microparticles in pollution studies.

Environmental crime scene analysis	Pivato, Alberto, GWINNETT, Claire and Varghese, George (2020) ENVIRONMENTAL FORENSICS: Environmental crime scene analysis. Detritus, 12. I-II. ISSN 2611-4135 : https://doi.org/10.31025/2611-4135/2020.14021	This article discusses environmental crime scene analysis and the challenges encountered during this type of crime scene analysis.
Environmental Forensics: The What? When? Where? Why? And How?	Pivato, Alberto, GWINNETT, Claire and Varghese, George (2020) Environmental forensic: ENVIRONMENTAL FORENSICS: THE WHAT? WHEN? WHERE? WHY? AND HOW? Detritus, 10. III-IV. ISSN 2611-4135 : https://doi.org/10.31025/2611-4135/2020.13963	An introduction to environmental forensics is provided in this article with reference to the what, where, who, when, who and why of this topic.
Quantification is more than counting: Actions required to accurately quantify and report isolated marine microplastics	Rivers.M.L, Gwinnett.C, Woodall. L.C, (2019) Quantification is more than counting: actions required to accurately quantify and report marine microplastics, Marine Pollution Bulletin, 139: 100-104 : https://doi.org/10.1016/j.marpolbul.2018.12.024	Research on marine microplastics is growing rapidly, with numerous studies published each year. However, to make these studies comparable, standardized methods for quantifying and analysing microplastics are needed. This study compared different parameters for measuring microplastics using data from neuston nets collected in 2016. Surface area was found to be the most accurate measure for describing plastic size and should be used to quantify plastics per square kilometre or cubic meter, alongside abundance. The study also compared two methods for calculating plastic concentration: flowmeter and ship's log. The ship's log generally provided smaller abundance estimates, except for one

		sample. This highlights the need for standardized techniques and measurements in microplastic research.
Shedding off-the-grid: The role of garment manufacturing and textile care in global microfibre pollution	Stanton, T., Stanes, E., Gwinnett, C., Xiaoyu, L., Cauilan-Cureg, M., Ramos, M., Sallach, J.B., Harrison, E., Osborne, A., Sanders, C.H., Baynes, E., Law, A., Johnson, M., Ryves, D.B., Sheridan, K., Blackburn, R.S., McKay. D (2023) Shedding off-the-grid: the role of garment manufacturing and textile care in global microfibre pollution, Journal of Cleaner Production, 139391. ISSN 0959-6526: https://www.sciencedirect.com/science/article/pii/S0959652623035497	Textile fibres are abundant anthropogenic pollutants. These fibres enter aquatic, terrestrial, and atmospheric environments, and biota. Textile fibres pose biological and chemical threats to the environments they pollute. Laundry is a primary source of synthetic and natural textile fibres. Fibre shed from laundry performed in electric washing machines is well characterised. However, over 50% of the global population does not have regular access to an electric washing machine. Without regular access to an electric washing machine, people launder 'off-the-grid' with locally specific methods. Their variable laundry methods present a significant challenge to quantifying microfibre shed. This study makes an original contribution to studies of fibre shedding. First, it details laundry protocols in a Global South community. Second, it assesses how textile structure influences fibre shedding independent of laundry practices. To do this, we deploy a hand laundry protocol learned during ethnographic fieldwork. We show that hand-washed garments shed fibres in numbers comparable to machine-washed garments. We show how garment construction (knit and weave) influences fibre shedding. We find fibre type (cotton or polyester) does not. People who hand wash clothing cannot change practices contributing to textile fibre pollution. Thus, industry must act to minimise fibre shed from laundry at the global scale. This entails transforming the design, manufacture, and sale of textiles.
Plastic microfibre ingestion by deep-sea organisms	Taylor, M, Gwinnett, C and Robinson, L and Woodall, L (2016) Plastic microfibre ingestion by deep-sea organisms. Scientific Reports, 6 (33997). pp. 1-9. ISSN 2045-2322 : https://www.nature.	Plastic waste is a distinctive indicator of the world-wide impact of anthropogenic activities. Both macro- and micro-plastics are found in the ocean, but as yet little is known about their ultimate fate and their impact on marine ecosystems. In this study we present the first evidence that microplastics are already becoming integrated into deep-water organisms. By examining organisms that live on the deep-sea floor we show that plastic microfibres are ingested and internalised by members of at least three major phyla with different feeding mechanisms. These results demonstrate that, despite its remote location, the

	com/articles/srep33997	deep sea and its fragile habitats are already being exposed to human waste to the extent that diverse organisms are ingesting microplastics.
Remote Sensing Technology for Environmental Forensics	Varghese G., Gwinnett C., Lega M. et al. (2022) Remote Sensing Technology for Environmental Forensics, Detritus, 2022, 18(I - III): https://digital.detritusjournal.com/file/get?code=f3d42db4-c297-48db-aaa1-d0bf69285349	Remote sensing involves acquiring data from a distance. This article discusses the use of remote sensing for environmental monitoring and environmental forensic applications.
Deep-sea anthropogenic macrodebris harbours rich and diverse communities of bacteria and archaea	Woodall LC, Jungblut AD, Hopkins K, Hall A, Robinson LF, Gwinnett C, et al. (2018) Deep-sea anthropogenic macrodebris harbours rich and diverse communities of bacteria and archaea. PLoS ONE 13(11): e0206220. https://doi.org/10.1371/journal.pone.0206220	The deep sea is the largest biome on earth, and microbes dominate in biomass and abundance. Anthropogenic litter is now almost ubiquitous in this biome, and its deposition creates new habitats and environments, including for microbial assemblages. With the ever-increasing accumulation of this debris, it is timely to identify and describe the bacterial and archaeal communities that are able to form biofilms on macro debris in the deep sea. Using 16S rRNA gene high throughput sequencing, we show for the first time the composition of bacteria and archaea on macro debris collected from the deep sea. Our data suggest differences in the microbial assemblage composition across litter of different materials including metal, rubber, glass, fabric and plastic. These results imply that anthropogenic macro debris provide diverse habitats for bacterial and archaeal biofilms and each may harbour distinct microbial communities.
Using a forensic science approach to minimize environmental contamination and to identify microfibres in marine sediments	Woodall, L. C., Gwinnett, C., Packer, M., Thompson, R. C., Robinson, L. F., Paterson, G. L. J., (2015) Using a Forensic Science Approach to Minimize Environmental	There is growing evidence of extensive pollution of the environment by microplastic, with microfibres representing a large proportion of the microplastics seen in marine sediments. Since microfibres are ubiquitous in the environment, present in the laboratory air and water, evaluating microplastic pollution is difficult. Incidental contamination is highly likely unless strict control measures are employed. Here we describe methods developed to minimize the amount of incidental post-sampling contamination when quantifying marine microfibre pollution. We show

	Contamination and to Identify Microfibres in Marine Sediments. Marine Pollution Bulletin, Volume 95, Issue 1, Pages 40–46, http://dx.doi.org/10.1016/j.marpolbul.2015.04.044	that our protocol, adapted from the field of forensic fibre examination, reduces fibre abundance by 90% and enables the quick screening of fibre populations. These methods therefore allow an accurate estimate of microplastics polluting marine sediments. In a case study from a series of samples collected on a research vessel, we use these methods to highlight the prevalence of microfibres as marine microplastics.

Published Datasets:

Title	Link/Reference	Description
Microplastic pollution isolation - a forensic science approach	Jackson, A.R.W.; Osborne, A.O.; Gwinnett C.M.B., Microplastic pollution isolation- a forensic science approach. Mendeley Data v1, (2021), https://doi.org/10.17632/jzppg7h8j4.1.	This dataset contains the raw experimental data that resulted from the simulation experiment reported by Gwinnett Osborne and Jackson (2021). It also contains the raw spectral data that was used to plot the Raman spectra given in that paper, together with the R code that was used to process and analyse both these sets of raw data and the output from that code.

Book Chapters:

Forensic Textile and Fibre Examinations for the Purposes of Improved Recovery, Analysis and Interpretation of Microplastic Pollution, in Microfiber Pollution from Textiles: Research Advances, CRC Press, 2023 : https://doi.org/10.1201/9781003331995	Textile materials shed microfibres during different phases of their life cycle. While much attention has been paid to the impact of microplastics

	on the environment, there has been less focus on the impact of microfibre pollution, which also poses a serious environmental threat. Microfibre Pollution from Textiles: Research Advances and Mitigation Strategies shines a light on the hidden effects of textile microfibre pollution and examines its generation in manufacturing, use including laundering, and disposal. It details advancements and gaps in the quantification and characterization techniques that are emerging in the growing field of study of microfibre pollution in textile technology. This book: - Examines the contributions of the textile and fashion industries to microfibre pollution, from production to disposal - Reviews recently developed methods and technological advancements in the identification and quantification of microfibres from textiles - Addresses emerging sustainable mitigation strategies and sustainable textile production methods that can potentially

	reduce or eliminate microfibre shedding - Details the state-of-the-art on existing regulations and standards and provides scope for future research in the area of standard development. By bridging the gap between environmental and textile studies, this book is aimed at researchers and advanced students in textile and environmental science and engineering.

Podcast Episodes:

Title	Link/Reference	Description
Claire Gwinnett talks forensic science	Lab Matters podcast. Episode 1:'Claire Gwinnett talks Forensic Science' https://labmatters.podbean.com/e/lab-matters-episode-one-claire-gwinnett/ https://labmatters.podbean.com/, 2023	Launching the new podcast 'Lab Matters' from Lab Innovations with host Harriet Gould and featuring and guest Professor Claire Gwinnett. Claire and Harriet are discussing all things forensics! Claire highlights the changes of the forensic science industry, the criminal justice industry an highlights the importance of environmental forensics
Microplastics are all around us	Royal Society of Chemistry, Series 1, Episode 3, 'Microplastics are all around	Microplastics are everywhere, from

	us' https://www.rsc.org/policy-evidence-campaigns/brought-to-you-by-chemistry-podcast/ 2021	the water we drink to the air that we breathe. But can they hurt us? And what are scientists doing to find out? Our guests for this episode, Professor Paul Anastas, Dr Winnie Courtene-Jones and Professor Claire Gwinnett join us to share their vast experience on this topic, looking at everything from the marine environment to the clothing industry, and from the science laboratory to the corridors of power.

Radio Features:

Title	Link/Reference	Description
Talking Point - Microplastics: A Potential Perpetual Polymer Problem	ABC radio, Australia, https://www.abc.net.au/listen/programs/overnights/ovn-microplastics-140624/103977004	Whilst it may seem like they may be the environmental topic du jour, microplastics could potentially be a forever problem. These pesky, teeny-tiny bits of plastic have been found at the bottom of the ocean, the snowy peak of Everest, in the belly of fish and in the private parts of perplexed people! What are they? How did they get there? How did we find

		them? What can we do to stop them? Rod spoke with Professor Claire Gwinnett, a world-leading microplastic expert and a forensic scientist from Staffordshire University, about the nitty-gritty polymer problem.
Microplastic hotspots discovered in Long Island Sound	WSHU radio, USA, https://www.wshu.org/news/2024-04-17/ct-long-island-sound-microplastic-hotspots	A scientific method to identify microplastic hotspots — areas of the ocean floor covered with small pieces of plastic — has been tested in Long Island Sound waters. Professor Claire Gwinnett from Staffordshire University in England worked with a team from The Rozalia Project for a Clean Ocean and Central Wyoming College to develop a system that tests open waters for microplastic hotspots.

Youtube:

Tedx Talks. A forensic scientist's approach to microplastics. YouTube. Accessed: 03/07/2024. Available from: https://youtu.be/YWRUWbx98vo?si=plM9olCzfXL5HGCB.	Forensic scientist Professor Claire Gwinnett asks how can we harness these same qualities to solve the global challenge of plastic pollution and provide sustainable alternatives for the future. Claire is a Professor in Forensic and Environmental Science at Staffordshire University and is recognised as one of the world's leading forensic fibre researchers. Her expertise is in the analysis and interpretation of fibres for the purposes of investigating

	crime and understanding environmental pollutants. Claire was part of the team that first discovered microplastics being ingested by deep sea organisms and has worked on microplastic research on the Great Barrier Reef in Australia, Hudson and Mississippi Rivers in the US, farmland in Turkey, Weddell Sea in Antarctic and rivers and coastal areas around the UK, including investigating freshwater otter spraint (poo!). Awarded a Winston Churchill Fellowship for her forensic fibre and microplastic work in 2018, she set up and leads the international Forensic Fibres and Microplastics Research Group which works with Government bodies, research establishments, charities and industry partners in 22 countries to provide global solutions to forensic science and environmental challenges. This talk was given at a TEDx event using the TED conference format but independently organized by a local community.
Staffordshire University. Researchers discover microplastics ingested by sea creatures. Youtube. Accessed: 03/07/2024. Available from: https://youtu.be/6e1COwZHIL8?si=4sihpbhJJ8wTxz1r	Dr Claire Gwinnett, Associate Professor in Forensic and Crime Investigation at Staffordshire University, has been working with a team of scientists who took samples of sea creatures at two sites in the Atlantic and Indian Ocean.

	Using the latest forensic laboratory techniques, Dr Gwinnett was able to determine that microplastics had been ingested by the sea creatures. This is the first time that evidence of this kind has been discovered. The study, funded by the European Research Council (ERC) and the Natural Environment Research Council (NERC), was a collaboration between Oxford, the University of Bristol, the Natural History Museum in London, and Staffordshire University's Department of Forensic and Crime Science.
Staffordshire University. #plasticfree alternatives...to food packaging. Youtube. Accessed: 03/07/2024. Available from: https://youtu.be/pBWEPcbXhrg?si=Hwvnqp42nLyrZEVo	Student Comms Ambassador Nat meets experts from Staffordshire University researching the impact of plastic pollution in our oceans and rivers. Dr Claire Gwinnett explains how we can all help to combat plastic pollution by using sustainable alternatives to plastic food packaging.
Staffordshire University. #plasticfree alternatives... for your washing machine. Youtube. Accessed: 03/07/2024. Available from: https://youtu.be/UW1SomYTNV8?si=ojDfr33s7waRyHyE	Student Comms Ambassador Nat meets experts from Staffordshire University researching the impact of plastic pollution in our oceans and rivers. Researcher Ellie Harrison explains how we can all help to combat plastic pollution with

	products that collect microfibres from clothing in our washing machines.
Staffordshire University. #plasticfree alternatives... for your bathroom. Youtube. Accessed: 03/07/2024. Available from: https://youtu.be/yv1Pihw3B64?si=XNTRyS69JDzRtphC	Student Comms Ambassador Nat meets experts from Staffordshire University researching the impact of plastic pollution in our oceans and rivers. Researcher Amy Osbourne explains how we can all help to combat plastic pollution by using sustainable alternatives to plastic products in our bathrooms.
Staffordshire University. Profs in the Pav – Pollution: Just because we can't see it, it doesn't mean it's not there! Youtube. Accessed: 03/07/2024. Available from: https://youtu.be/55ILT1RZMhY?si=lefaRi8PURdfpn1b	By Professor Claire Gwinnett, Professor of Forensics and Environmental Science and Professor Jon Fairburn, Professor of Sustainable Development. Pollution is the theme that links together the research of Prof Claire Gwinnett and Prof Jon Fairburn. Claire has carried out word leading research into plastic pollution into our seas and oceans. This research has taken her from the Hudson River in the United States to the Great Barrier Reef in Australia. Jon has been carrying out research for the UK government and the World Health Organization for over 10 years. Inequalities in air quality, the siting of waste sites and clustering of such facilities in poor areas ties into

	an agenda of environmental justice. The link between Claire and Jon's work has recently become more explicit with new research showing the links between transport for both air quality and plastic pollution. The talk will discuss the evidence for the mechanism of pollution, what we as individuals can do to help the situation and suggest policies for politicians and others to adopt featuring case studies of good practice.