

2023

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Truscott, J.B. (2023) 'Fostering academic literacy and unveiling student excellence in STEM (Science, Technology, Engineering, and Mathematics) research at the University of Plymouth, UK', *The Plymouth Student Scientist*, 16(2), pp. i-v.

<https://pearl.plymouth.ac.uk/handle/10026.1/21871>

The Plymouth Student Scientist
University of Plymouth

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Fostering academic literacy and unveiling student excellence in STEM (Science, Technology, Engineering, and Mathematics) research at the University of Plymouth, UK

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Six years ago, when I stepped into the role of Editor for this journal, I couldn't have foreseen the incredible wealth of talent nestled within the student cohort at the University of Plymouth (Truscott, 2018). The journey through their undergraduate research endeavours has been truly remarkable, a testament not just to their inherent abilities but also to the exceptional guidance provided by their research project supervisors and external sponsors. Each passing year unfolds as a unique odyssey through the diverse realms of STEM (Science, Technology, Engineering, and Mathematics), all thanks to the steadfast commitment of these students to inquiry within these fields. This journal, beyond being a platform for showcasing undergraduate project research, actively contributes to the learning curve, providing students not only with a publication outlet but also a valuable experience in academic writing and research literacy. Excitingly, this commitment was recently acknowledged as an “outstanding” contributing factor (Office for Students, 2023, p. 6) in the University's attainment of the prestigious Teaching Excellence Framework (TEF) 2023 Gold award (University of Plymouth, 2023), an accolade shared by the dedicated students and supervisors who fuel this journal annually.

With its global reach, the journal aspires to make a substantial impact on research and education. It serves as an educational resource, allowing students worldwide to enhance their academic writing and research skills by engaging with the articles published here. Indeed, fostering academic growth and inspiring students to transition from undergraduate research to postgraduate studies is a notable outcome of this journal. It's essential to note that this journal is managed and supported by an Editor who also serves as a Learning Development Advisor within Student Learning Services - part of the larger Library and Academic Development (LAD) directorate - dedicated to aiding both students and staff in their academic journeys and specifically honing their academic literacy. Maintaining a focus on supporting undergraduate research writing, the journal stands as a learning platform for supervisors across faculties at Plymouth. Its mission extends beyond publishing students' research globally; it aims to cultivate a culture of academic excellence and critical thinking within the student community. This collaborative endeavour celebrates the accomplishments of our talented students and significantly contributes to advancing scientific knowledge and inquiry. Yet, beyond the accolades, and once again, this edition serves as a testament to the burgeoning

scientific talent within our student undergraduate academic research community. Showcasing sixteen exceptional undergraduate student projects across various faculties, each are beacon of intellectual curiosity and scholarly dedication.

Personally, I was very excited to see such a range of topics, so where to start? Perhaps by stepping into a captivating journey within the biological and marine science, with Bailey's (2023) exploration of a coastal environment. This work focused on utilising bathymetric study to examine nearshore waves at Croyde. Absolutely fascinating, because it not only contributes valuable insights to marine science, but also holds relevance for the local community, given the strong surfing culture in Croyde. Following this, Burnet's (2023) meticulous exploration of marine heatwaves unveils the physiological responses of fucoid species, enriching our comprehension of their adaptive mechanisms. Closer to home is Hawcutt's (2023) exploration of bat activity and diversity in Plymouth's green spaces providing helpful discoveries that would support conservation efforts, such as the role of bats in maintaining ecosystem balance. It's amazing what is often out there that might go unnoticed by those out on a daily walk. Of course, the University of Plymouth being a coastal university allows many opportunities for water-based research, and in fact some students even become divers as part of their degree. In this respect, Lintin's (2023) investigation takes us beneath the surface of Plymouth Sound, examining the spatial and temporal distribution of microplastics within its sediment—highlighting it as a growing issue of concern for the environment's health. Similarly, Thompson (2023) also navigates Plymouth's underwater realms, studying the impact of colony morphology and substratum inclination on the distribution of *Eunicella verrucosa* on shallow reefs, expanding our knowledge of coral ecology. This makes a worthy contribution to reef conservation and management, especially in the face of environmental challenges, such as habitat degradation.

Controversially, Wick (2023) looks at policies surrounding official whaling practice documentation, in particular scrutiny of the "scientific exemption clause". This clause is being used by some trawling companies as a loophole for continued legal international whaling practices, where the intention of the documents and clause was to reduce whaling—an extremely important topic close to many of us concerned about saving whales. Then Capps (2023) biomedical paper guides us through the Yealm Estuary's seagrass beds, exploring the diversity and "bioactive potential" of bacteria associated with *Zostera marina*. Unexpectedly, to me, emphasising not only how seagrasses play a vital role in coastal ecosystems, but also how their bioactive molecules contain amazing pharmaceutical potential! Whereas the fascinating co-research from mathematicians Keeling & Oben (2023), which contributes a statistical analysis of the Barbel fish population in the River Teme, raising concerns about population fluctuations. This very much highlights how mathematics can be an excellent tool to enhancing our deeper understanding of natural phenomena. Certainly, in such cases understanding population dynamics is crucial for effective conservation and sustainable management of all aquatic ecosystems. Moving to a geography, earth, and environmental sciences

perspective, Bentley's (2023) study on the potential use of UK wetland plant species in paludiculture offers a sustainable solution for wetland management. Thus, growing specific wetland plants like *Typha latifolia* and *Phragmites australis* in places like the Somerset Levels could help restore the environment. In contrast, Blogg's (2023) examination of hedgerow age and its impact on vegetative species diversity contributes to our understanding of biodiversity in agricultural landscapes. Notably, both studies provide excellent insights into furthering our understanding of these unusual environments.

Looking at additional land-based research initiatives, Clapp's (2023) exploration into veteran and ancient trees details the ecological importance of such trees. No doubt, understanding their influence on invertebrate species will contribute to conservation strategies for preserving veteran and ancient trees, in similar natural and urban environments. From an educational and learning perspective, Hill's (2023) important study on informal education settings offers a glimpse into engaging primary school children with environmental issues, such as plastic pollution and climate change. It also features detailed drawings from the children on how they interpret those issues, making it a rather fun and enjoyable read. Of course, this extensive research has important implications for designing effective environmental education programs, especially for young school children. McCabe's (2023) takes a deep focus on *Chiroptera* emergences and sheds light on the factors affecting bat populations, emphasising the vital role of bats in maintaining ecosystem balance. I am confident this research will further aid in focusing conservation efforts aimed at protecting bat species and their habitats and in this respect links rather well to Hawcutt's (2023) work from a conservational perspective. However, Zavala Quiroga's (2023) investigation into the diversity, abundance, and distribution of ground invertebrates in Lower Sharpham Farm contributes to our understanding of rewilding initiatives, highlighting the success of this approach in promoting biodiversity. There is something personally satisfying about these rewilding initiatives, and this research certainly helps to support similar sustainable environmental practices. Last but certainly not least, the highly topical, important, and controversial topic of Wilson's (2023) psychology paper adds a unique dimension to our exploration by examining trust in human-like robots. I somewhat feel that this study also has implications for the field of artificial intelligence (AI) and human-robot interactions, accentuating the need to understand the psychological aspects of technology adoption. Many of you reading this paper may be asking the question, can we ever trust robots and AI? Do read it for yourself and consider if you develop new views on human-like robot trust.

As we celebrate the diverse investigative achievements of these talented students, we also look forward with optimism to the future of more STEM based inquiry. The seeds planted by these projects have the potential to grow into transformative contributions, influencing not only the scientific and academic landscape but also the broader societal understanding of the world around us. These sixteen undergraduate students remind us of the power of scientific curiosity, the significance of collaborative exploration, and the

enduring impact of dedicated critical thinking and inquiry. They underscore how universities can play an important role as a nurturing ground for shaping the future of STEM research and education. I would therefore encourage all to read the articles within, appreciate the time and efforts of these students, and consider the journal as a learning platform to foster future research in higher education and beyond.

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