Failure Modes of Engineering

FeME Steps

Student **T**eams for **E**nvironmental and **P**articipatory **S**olutions

Information Package for Student Participant

Failure Mode 1: Diverse Engineering

Failure Modes of Engineering

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Introduction

FeME Steps is a five-week summer programme (1st June to 10th July 2026) where multidisciplinary student teams work on real climate and sustainability challenges set by external partner organisations. Run by Failure Modes of Engineering — a network dedicated to building a more inclusive and sustainable future for engineering with and for women and under-represented groups. This programme connects students from the University of Edinburgh, University of Glasgow, and Heriot-Watt University.

Each team will tackle genuinely complex, open-ended problems that have real social and environmental stakes. You'll contribute around 40 hours of work over the five weeks, supported by coaching sessions, guided worksheets, and direct access to your partner organisation. At the end of the programme, your team will present your findings and recommendations directly to them — and they are genuinely committed to taking your ideas seriously. The programme is interdisciplinary so you absolutely do not need to be an engineer! What you do need is curiosity, a willingness to collaborate across disciplines, and a genuine interest in making a difference. By the end of the programme, you'll have gained real industry-relevant experience, strengthened your interdisciplinary and creative problem-solving skills, and the confidence that comes from contributing to something that truly matters.

Please complete the following application (https://forms.office.com/e/4HwfXyg01i) by **Wednesday 6th May at 5 PM BST**. If you have any issues with your application or require assistance, please email jeanne.michalon@ed.ac.uk. Financial support is also available for those with caring responsibilities or other participation needs, so please don't let that be a barrier to applying.

FeME

The Programme

About FeME
FeME (Failure Modes of Engineering) is a network dedicated to building a more inclusive, resilient, and sustainable future for engineering. Our mission is to reshape engineering culture so that it better confronts the twin crises of climate change and biodiversity loss — and does so in ways that recognise the disproportionate impact these crises have on women, children, and underrepresented communities. We believe the future of engineering depends on empowering diverse voices, and FeME Steps is one of the most direct ways we are making that happen

What is FeME Steps?

FeME Steps is a five-week summer project programme running from **1st June till 10th July**. You will join a multidisciplinary team of students to work on a real challenge set by one of our external partner organisations. These partners are organisations actively working on issues related to climate change, environmental resilience, mitigation, or justice — and they have identified a genuine problem that they need fresh eyes and creative minds to help address. This is not a theoretical exercise. The work you produce will be shared directly with the partner organisation, and where possible, they are committed to taking your ideas seriously and considering them for real-world implementation.

Who is it for?

FeME Steps particularly welcomes applications from women and students from underrepresented communities, as well as anyone who is passionate about working in an inclusive, collaborative, and forward-thinking environment. [Does IT SOUND OKAY] You do not need to be an engineering student — in fact, the programme is specifically designed to bring together students from a wide range of disciplines. Every team will include at least one engineer, but we actively want participants from the arts, social sciences, design, natural sciences, law, business, and beyond. Students from the University of Edinburgh, University of Glasgow, and Heriot-Watt University are all eligible to apply.

What does the programme look like in practice?
The programme runs over **five weeks**, during which you are expected to contribute approximately **40 hours of work**, roughly the equivalent of one working day per week. Your time will be structured and well-supported. You won't be left to figure things out alone.

Here's what you can expect:

- **Structured worksheets and guided tasks** to help your team move through the problem systematically and creatively.
- **Coaching and mentoring sessions** with experienced facilitators who will help you navigate both the subject matter and the dynamics of working in a multidisciplinary team.

- **Support for data handling** — you'll be given guidance on how to work with any information or data the partner organisation provides.
- **Direct access to your partner organisation**, who will deliver an introductory presentation, be available to answer questions by email, and attend a video call with your team during the programme.
- **A final presentation event**, where your team will share your findings, recommendations, and ideas directly with the partner.

The programme is designed to give you genuine creative freedom. We want you to take risks, think boldly, and explore ideas that might feel unconventional. This is a safe space to be adventurous.

What will you gain?
Participating in FeME Steps is a genuinely valuable experience, both professionally and personally. By the end of the programme, you can expect to have gained:

- **Real industry-relevant experience** that you can speak to confidently in job applications, interviews, and your CV.
- **Interdisciplinary collaboration skills** — one of the most sought-after competencies in today's workplace, and something that can only really be learned by doing.
- **Creative problem-solving experience** on a challenge with genuine societal and environmental stakes.
- **First-hand insight** into how your discipline connects to and enriches engineering — or how engineering connects to and enriches your discipline.
- **Confidence** in your ability to contribute meaningfully to a complex, real-world project and produce something that others can actually use.
- **Connection to the FeME network** — a growing community of students, academics, and organisations committed to making engineering more inclusive and impactful.

What will you be working on?
Your team and your team will be assigned a challenge give by an external partner, it is a real problem they are facing that has a broader social or environmental dimension. Good FeME Steps challenges are complex, open-ended, and genuinely benefit from being looked at from multiple angles. They won't have one "right" answer, and they won't require you to be a deep technical specialist in any single field. Instead, they reward exactly the kind of holistic, creative, collaborative thinking that multidisciplinary teams do best.

FeME

The Challenge Proposals

Partner and Challenge Snapshot

This table provides a breakdown of partners and challenges. See the section below for more information on each challenge.

Partner	Challenge
Booth Welsh, Irvine, Scotland	Challenge 1: Booth Welsh – Landslide. *How do you stop the Landslides at Rest and be Thankful?* Challenge 2: Booth Welsh – Electronics. *How can we reduce or replace plastic usage in our electronic components?* Challenge 3: Booth Welsh – Ferry. *What alternative methods to reduce fuel cost to transport people and goods to islands?*
NHS Lothian, Edinburgh, Scotland	Challenge 4: NHS Lothian – Waste Sorting. *How to ensure the right waste goes in the right bin in a hospital environment?* Challenge 5: NHS Lothian – Packaging. *How to reduce packaging of medical consumables in the hospital context?*
BlazeBalm, Dumfries & Galloway, Scotland	Challenge 6: BlazeBalm – Vertical Farming. *How to optimise space usage in the BlazeBalm to allow for production to increase?* Challenge 7: BlazeBalm – Thermal Farming. How do we develop a sustainable manufacturing process in Scotland for Blazebalm?
Superglass by Etex UK Insulation Ltd, Stirling, Scotland	Challenge 8: Etex – Insulation Waste. *How to repurpose scrap product from glass wool production line?*
Cefas, Lowestoft, England	Challenge 9: Cefas – Bycatch. *How can we value the bycatch in Scotland to diversify seafood consumption?* Challenge 10: Cefas – Seaweed. *How can we sustainably integrate seaweed consumption into Scottish consumer habits?*

Full Partner and Challenge Information

Partner: Booth Welsh, Irvine, Scotland

As a multi-discipline engineering powerhouse, we deliver end-to-end solutions, from initial concept and FEED studies through to design, build, and implementation. Our expertise spans process, electrical, instrumentation, mechanical, and piping engineering, making us the trusted partner for clients in highly regulated industries.

> **Challenge 1: Booth Welsh – Landslide.** ***How do you stop the Landslides at Rest and be Thankful?***
>
> From 2007-2021, Rest and be Thankful was closed for 180+ days due to landslides. It is a key route and causes significant disruption when shut. This can be a major issue for delivering equipment and solutions to site. It costs road departments millions.
>
> **Challenge 2: Booth Welsh – Electronics.** ***How can we reduce or replace plastic usage in our electronic components?***
>
> Many electrical components require plastic for safety, functionality or ease. It is a part of everything we do. Microplastics and emissions from plastic manufacturing are a major impact on the environment and climate change.
>
> **Challenge 3: Booth Welsh – Ferry.** ***What alternative methods to reduce fuel cost to transport people and goods to islands?***
>
> The MV Glen Sannox ferry serves the busy route to Arran. It is a dual-fuel ferry capable of running on liquified natural gas or diesel. The sustainable and financial impact of these new 'green' ferries is questioned by the local community. It's a major political point of discussion.

Partner: NHS Lothian, Edinburgh, Scotland

NHS Lothian provides a comprehensive range of primary, community-based and acute hospital services for the populations of Edinburgh, Midlothian, East Lothian and West Lothian. We also provide selected services for patients in the Borders and in Fife and are a national centre of expertise for various specialties provided to people across Scotland. NHS Lothian has an annual budget of £1.6 billion and employs approximately 26,000 staff.

> **Challenge 4: NHS Lothian – Waste Sorting.** ***How to ensure the right waste goes in the right bin in a hospital environment?***

NHS Lothian has 3 main types of bins in the healthcare facilities: general waste, clinical waste and recyclable waste. After an audit of the bins' contents, it is clear that the users struggle to use these bins correctly. Those errors carry financial and ecological costs.

Challenge 5: NHS Lothian – Packaging. ***How to reduce packaging of medical consumables in the hospital context?***

NHS Lothian requires medical consumables that tend to be over packaged by multiple layers of wrapping or hard to recycle materials. Packaging of medical goods protects them from potential contamination and physical damage as well as providing key information to the users. Packaging is necessary but could potentially be optimised to reduce waste while being user-friendly for the practitioners.

Partner: BlazeBalm, Dumfries & Galloway, Scotland

BlazeBalm is a biotechnology start-up developing a patent-pending biomembrane system designed to protect buildings and critical infrastructure from ember-driven wildfire destruction. Our solution functions without the need for water, mains power, or specialist crews, providing multi-day, multi-phase ember quenching through a resilient, 96% bio-based material. Produced via a low-intensity fermentation process that upcycles agricultural and aquacultural waste, BlazeBalm offers a scalable, environmentally responsible alternative to petrochemical retardants.

Challenge 6: BlazeBalm – Vertical Farming. ***How to optimise space usage in the BlazeBalm to allow for production to increase?***

Currently the biomembrane is produced in slabs in trays with a space-to-product ratio of 1:1. Each slabs are then fused together to create a cloth like material. As the business expands, they are looking for inspiration from a broad range of disciplines—from engineering and architecture to literature and history—to find precedents for how space can be managed effectively.

Challenge 7: BlazeBalm – Thermal Farming. How do we develop a sustainable manufacturing process in Scotland for Blazebalm?

For bacterial cellulose to grow, the temperature must be maintained to above 15C. BlazeBalm is based in Dumfries & Galloway, and would like to produce their product locally. They would like to find a passive or low-energy way to maintain a stable and homogeneous incubation temperature.

Partner: Superglass by Etex UK Insulation Ltd, Stirling, Scotland

Superglass is one of the UK's leading glass mineral wool insulation manufacturers, with a heritage of almost 40 years. Today, as part of global building materials manufacturer, Etex we have access to world-leading

research facilities and are focussed on using glass science in the development of our product solutions – which can be found on construction sites the length and breadth of the country.

Challenge 8: Etex – Insulation Waste. ***How to repurpose scrap product from glass wool production line?***

Insulation mineral wool is made from glass getting heated, spun and interwoven to make a wool-like material. It is then compressed and packaged into roll and slabs. Throughout this manufacturing line, scraps of finished goods are created. Etex is looking for alternative ways of dealing with this waste to avoid putting it to landfill to align to their organisational sustainability aims.

=> This challenge includes a site visit of the manufacturing plant.

Partner: **Cefas, Lowestoft, England**

Research into the marine and freshwater environment, including biodiversity, pollution, aquatic food, marine energy, and climate change.

Challenge 9: Cefas – Bycatch. ***How can we value the bycatch in Scotland to diversify seafood consumption?***

Scotland's fishing and aquaculture industries are economically significant, yet a persistent mismatch exists between what Scottish waters can produce and what UK consumers actually eat — with demand heavily concentrated on just five species, leading to a situation where much of what is caught is exported while most of what is consumed is imported. This narrow focus creates both environmental pressure on those heavily targeted species and vulnerability to climate change, as warming Scottish waters may make some of them harder to catch or farm in future. Diversifying the seafood we eat is therefore both a health and a resilience imperative, and one promising route is developing a market for edible bycatch — species incidentally caught but currently discarded due to legal restrictions or lack of consumer demand — which could broaden diets, support fishing communities, and make the industry more robust in the face of future environmental change.

Challenge 10: Cefas – Seaweed. ***How can we sustainably integrate seaweed consumption into Scottish consumer habits?***

Seaweed has a long history as a food source in Scotland, from ancient Pictish and Norse diets to its industrial use as a food thickener, and growing interest in plant-based alternatives to the UK's dominant animal-based seafood consumption is bringing it back into focus. Scotland's extensive coastline and clean waters make it well-suited for seaweed production, but unlike parts of Asia and Oceania, eating seaweed remains uncommon in modern Scottish culture, meaning the industry faces both a promising opportunity and a currently limited domestic market. To realise its potential, the sector must tackle challenges on two fronts: developing appealing, consumer-ready products

through technological innovation across the supply chain, while also finding ways to grow demand through social and cultural change — all pursued in a way that avoids the environmental pitfalls that can accompany any emerging industry.

FeME Code of Conduct

The FeME Code of Conduct outlines the shared standards and behaviours that guide how we work together with respect, inclusion, and care. It ensures all members, partners, and participants help create safe, equitable, and supportive spaces built on integrity, openness, and trust.

1. All members, staff, and participants are expected to act with respect, integrity, and inclusivity. Our community expectations are:
2. Treat everyone with respect, kindness, and professionalism.
3. Value and actively listen to diverse perspectives, particularly from underrepresented groups.
4. Work collaboratively and share credit for successes.
5. Be transparent in your actions and decisions and take accountability for mistakes.
6. Communicate openly and constructively, avoiding exclusionary or harmful behaviour.
7. Create accessible and inclusive spaces, both online and in-person.
8. Use resources responsibly, with care for environmental and social impact.

FeME Commitments

- **Ethical Data Practice -** All projects funded through FeME must uphold the highest standards of data ethics and integrity. This includes compliance with GDPR and the UK Data Protection Act (2018), responsible data collection and storage, and anonymisation of any sensitive equality, diversity, or inclusion (EDI) information.
- **Open Knowledge and Attribution -** FeME is committed to open, transparent, and collaborative research. Wherever possible, project outputs, data, and materials should be made openly available through FeME's digital platforms, with clear recognition and credit for all contributors and partners.
- **Equity, Diversity, and Inclusion (EDI) -** EDI principles are integral to every FeME funding call. We ensure diverse and trained assessment panels, accessible application processes, and inclusive authorship practices. Teams are encouraged to embed EDI in their own project design and delivery, with funding available through FeME's Caring Pot to support caring responsibilities or participation needs.
- **Wellbeing and Care -** FeME recognises that equitable collaboration depends on care and flexibility. Funded activities should prioritise participant wellbeing and accessibility, including consideration of

time zones, caring responsibilities, and access needs. Hybrid and flexible participation should be standard practice wherever feasible.

- **Climate and Sustainability -** All FeME-funded work contributes to addressing the interconnected crises of climate change and biodiversity loss. Projects should model sustainable practices in their operations and travel, and consider the long-term environmental and social impacts of their methods and outcomes.

These guidelines sit alongside FeME's Terms of Reference and apply to all funded activities under the FeME net.

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