

Driving the Electric Revolution Undergraduate Award

The Driving the Electric Revolution Undergraduate Award 2022 recognised four outstanding students at the beginning of their Electrical and Electronic Engineering degree course, who had an interest in Power Electronics, Machines and Drives (PEMD).

In a collaboration between UK Research and Innovation (UKRI) and the UKESF, as part of the wider DER Challenge skills initiative, the Award aimed to raise awareness of PEMD among undergraduates and encourage them to pursue careers in the sector.

There was an overwhelming response, with 53 high-quality applications received from undergraduates studying at UKESF partner universities. The four Award winners received:

- A one-off bursary of £1,000
- A paid summer work placement with a leading employer
- Opportunities to network and to learn more about PEMD by attending events such as the Centre for Power Electronics (CPE) Annual Conference
- Female Award holders also received a paid-for student membership of the Women's Engineering Society (WES) for the duration of their degree course

53

Undergraduate
Applications

16

UKESF Partner
Universities

4

Award-winning
Undergraduates



Marcus Perrin, James Taylor and Emily Dale, DER Award winners, with Connel Williams, ZF Automotive and Stewart Edmondson, UKESF

Why is PEMD important?

PEMD are technologies that enable the control and delivery of electrical energy. These technology sectors are growing fast as they are vital in allowing the world to reach net zero. PEMD technologies are used across many sectors including transportation, energy generation and distribution, industrial machines and robotics.

UK participation in, and leadership of, technological advances in PEMD is being limited by a chronic skills shortage in Electronic Engineering. Over a number of years, too few students have been studying Electrical & Electronic Engineering and as a result, there are too few graduate engineers to drive forward innovation and progress. This shortage is compounded by a lack of awareness of PEMD.



About the Award

The Driving the Electric Revolution Undergraduate Award aimed to raise awareness of PEMD amongst students at the beginning of their undergraduate study, with a view to help to attract more young engineers towards careers in the sector.

Undergraduates were invited to submit an application form to be considered for the Award. In total, 53 applications were received from undergraduates at 16 UKESF Partner Universities:

University	Number of Applications	University	Number of Applications
Bath	1	Liverpool	1
Birmingham	11	Loughborough	3
Bristol	6	Manchester	1
Cambridge	1	Nottingham	1
Cardiff	3	Sheffield	5
Edinburgh	1	Southampton	5
Heriot-Watt	4	Surrey	5
Imperial College	2	York	3

Two organisations participated in the Award, Collins Aerospace and ZF Automotive. Four undergraduates were recognised and had the opportunity to gain a minimum of 6 weeks work experience at one of the organisations.

The entire process with UKESF was well supported and effective, we were given very high calibre applicants, narrowing these down to the three we took on the DER Award Scheme. Our placement candidates came from ICL, Manchester and Sheffield Universities, and all three were allocated projects relating to PEMD. The energy and intelligence they brought was outstanding, our challenge is to keep them in Engineering and more specifically PEMD.

Philip Langley, ZF Automotive

Impact

The high number of applications from undergraduates at UKESF partner universities nationwide demonstrates that there is considerable interest in PEMD. The Award provided an opportunity for students to develop their understanding and gain valuable experience to support their future decision making.

The award winners provided positive feedback of their experiences:

"During the placement, I built upon what I had previously learned at university, as well as learning about more advanced electronics which I have not encountered before.

I felt that I was able to learn a lot about electronics in a short period of time and I saw how the theory that I learned at university is applied in industry. I also felt very fortunate to be able to visit Ireland and attend a meeting with a major semiconductor manufacturer and gain more insight into the supply of semiconductors and the future development of MOSFET technologies, especially in SiC MOSFETs.

My future plans and career aspirations include PEMD because I am interested in the future development of semiconductor devices and how switching speeds, size and cost can be improved. I am also interested in the applications of these devices in important electronic equipment such as converters and DC motors and would like to learn and experience more in this field."

Elaine Tian Galloway undertook her placement at Collins Aerospace

"I undertook a 10-week placement at ZF in Shirley Solihull. My project was heavily focused on modelling in MATLAB and Simulink, a major opportunity to develop new technical skills and work with tools I had never used before. I collaborated with many engineers from different fields and also had opportunity to see other types of work that go on at ZF and tour the labs. I was involved in giving 2 presentations during my placement, which helped develop my confidence and communication skills.

My future plans and career aspirations include PEMD because I found the aspects of automotive engineering that I encountered at ZF provided complex challenges and worthwhile results. I am particularly interested in the challenges around renewable energy, but would definitely consider a career in the automotive industry too.

I am very grateful for all the support I have received from UKESF and it has built on my career aspirations massively."

Emily Dale undertook her placement at ZF Automotive

"Working at ZF automotive in the servo drives department on an energy storage system for automotive actuators, I learnt a lot about using simulation software as well as lab skills and research skills.

Having only done 1 year at university and one work placement I can't say 100% that my future plans and career aspirations include PEMD, but PEMD is certainly on my radar!

James Taylor undertook his placement at ZF Automotive



L–R: James Taylor, Marcus Perrin and Emily Dale, DER Award winners at the Centre of Power Electronics Annual Conference

Diversity and Inclusion

It was important that the DER Award took action to address the gender imbalance in Electronic Engineering. As a result of our strong and positive message about improving equality and diversity in PEMD, applications came from a more diverse group than is typical for Electronics Engineering student cohorts:

- 61% of applicants were from ethnic minorities
- 28% of applicants were from females
- 87% of applicants were state school educated
- 43% of applicants were first in family to attend university

Where next for the DER Award?

The pilot of the Driving the Electric Revolution Undergraduate Award was successful in generating awareness and interest in PEMD among a diverse range of engineering students. It provided participants with valuable work experience at the start of their university studies and helped support their professional skills development.

Beyond the pilot, we would hope to help the DER Challenge to scale up the Award and enable more high-achieving undergraduates an opportunity to gain work experience in PEMD.

With Thanks

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About the UKESF

The UK Electronics Skills Foundation (UKESF) is an educational charity established in 2010. In the UK, Electronics, especially semiconductor design and manufacture, is a growing and strategically important sector of our economy. However, the demand for capable graduates far outstrips supply.

The UKESF works to tackle this national skills shortage in a coherent way; it operates collaboratively with major companies and leading universities. The UKESF also undertakes outreach and engagement activities to ensure that more schoolchildren are aware of Electronics and the opportunities available. This is achieved through a range of education Electronics-focused activities, projects and teacher training.

“Moving beyond talk about the skills shortage to take positive action is what the UKESF is all about.”

Stew Edmondson, CEO, UKESF