

# Annual Review 2020/21



"In the past two years as a Scholar, the UKESF has taught me that becoming an Engineer is about much more than knowledge and good grades, joining a far greater community of people who are, in the most literal of terms, changing the world."

Oana Lazar, UKESF Scholar (Southampton/UltraSoC), awarded a Highly Commended for her 2020 Scholar of the Year entry

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Gavin Fish, UKESF Scholar (Southampton/Moortec), 2020 graduate, now working for his UKESF Sponsor Company

"I have found the Scheme incredibly valuable, and it has given my career a massive jump start! I will forever be grateful for this opportunity, and would highly recommend the UKESF to anyone that is following a similar path."

## About the UKESF

#### The UKESF's mission is to encourage more young people to study Electronics and to pursue careers in the sector.

610 students have received UKESF Scholarships since 2010 In the UK, the Electronics sector is big, valuable and growing; however, the demand for capable, employable graduates is currently outstripping supply. The UKESF is an educational charity, launched in 2010, with both public and private seed-corn funding. We operate collaboratively with major companies, leading universities and other organisations to tackle the skills shortage in the Electronics sector.

We ensure that more schoolchildren

are aware of Electronics and the opportunities available, helping them to develop their interest through to university study. At university, we support undergraduates and prepare them for the workplace.

Registered charity number: SC043940 www.ukesf.org



of employers would recommend the UKESF

# Introduction

Lynn Tomkins, Chair

It is my pleasure to welcome you to this year's Annual Review. Having been a director of the UKESF since its creation I took over as Chair when my colleague and fellow co-founder Indro Mukerjee took up his role as CEO of Innovate UK, earlier this year.



From the outset our aim for the Foundation has been to build the future by inspiring and supporting students and Scholars into the Electronics industry. The pandemic has meant that this has been another challenging year for all of us. However, I am very pleased to report that the Foundation has been able to continue successfully. We have been able to launch a new "Insight into Electronics" project this year, which has already proved incredibly popular. I am also pleased that we are working hard to address the gender imbalance in the sector through our "Girls into Electronics" initiative.

At the heart of our Foundation is the undergraduate Scholarship Scheme. As noted in the Review, it is great testimony to the success of the Scheme that over 90% of the students we have supported are now graduate engineers working in our sector, and a highlight for me this year was to visit the University of York and meet our Scholars at the Summer Workshop.

On behalf of the UKESF Trustees and Board, I would like to offer a personal "thank you" to all of our sponsors, partners, Scholars and, of course, our hard-working UKESF team who have excelled in their performance this year.

The Year at a Glance

64

# 88%

of Scholars who graduated in 2020 are involved in Electronics sector

# 9

new companies joined the UKESF Scholarship Scheme

# 250

more secondary schools provided with "Electronics Everywhere" resources 26 leading UK universities for

Scholarships awarded

Electronics are UKESF partners

**891** Twitter followers (@theUKESF) 450

"Insight into Electronics" kits sent out since July launch

**52** Scholars graduated

**2,605** average number of unique website users per month

### **Scholar Destinations**

Since 2010, **610** students have been awarded a UKESF Scholarship and **385** Scholars have graduated, **18%** of whom went on to undertake further study or research (PhD/MSc).

Of those who have completed their studies, **91%** work in the Electronics and Technology sectors. **59%** of employed former Scholars work for a UKESF Sponsor Company.

# **Executive Statement**

Stew Edmondson, CEO

Welcome to our Annual Review for 2020/21. This has been another difficult and very different year dominated by the COVID-19 pandemic; however, it has been a rewarding and ultimately successful one for the UKESF.



The year started with another very strange few months of uncertainty and disruption caused by global lockdowns. As a result, our activities during the first quarter were very much curtailed and we implemented a number of cost-saving measures.

While a downturn in the global economy is clear, it's encouraging that Electronics has fared better than most sectors; indeed, demand particularly for semiconductors is high as major markets accelerate into a recovery. In the UK, we are seeing a renewed focus on technology and innovation, for instance around electrification. This means that our work connecting universities with industry is now even more vital.

Within the UKESF the year has seen some changes to our governance; we have welcomed two new Trustees to our Steering Board and also seen a change of Chair. Indro Mukerjee stepped down after more than a decade of outstanding service to our Foundation. Everyone at the UKESF thanks him for his massive contribution and we all wish him well in his new role at Innovate UK.

Looking back over the year, there have been a number of highlights.

Our Scholarship Scheme continued to attract the best students and the support of leading companies in the sector; both applications and awards were higher than we forecast at the start of the year. The growth and success of the Scheme depends upon the relationship with our sponsor companies, so it is reassuring to know that employer satisfaction remains exceptionally high. In a recent survey, 96% of respondents said that they would recommend the UKESF.

In October, I collaborated with UKESF Trustee Prof Bashir M. Al-Hashimi CBE to write an article titled 'Engineering as a Caring Profession', which was published in *The Engineer* magazine. We said, "In order to inspire the next generation of engineers, we must ensure that the curriculum reflects the ways in which engineering addresses the big global challenges". This important theme is something that we will be developing further next year.

As part of our work to encourage more young people to learn more about Electronics, we have launched a new initiative, "Insight Into Electronics", in collaboration with Aston University; we have been inundated with youngsters signing-up for the project, which is fantastic news. We have also been able to expand our "Electronics Everywhere" project for sixth formers to a further 250 schools during the year. In the summer, we held a successful "Girls Into Electronics" course and we have plans to scale-up this important initiative in 2022.

None of this work would have been possible without the support of our many stakeholders. Therefore, I would once again like to extend my personal and heartfelt thanks to all those individuals and organisations with whom we have collaborated. To our sponsors, partners, scholars, volunteer trustees and, of course, our hard-working team at the UKESF.

# **Highlights of the Year**

#### Insight into Electronics

In July 2021 we launched an exciting new initiative called 'Insight into Electronics', a collaboration between ourselves and Aston University. The course is self-paced, interactive and free, and aims to provide young people with a flexible, hands-on introduction to microcontrollers, Electronics and programming. As well as an extensive guide and informative videos, participants also receive a free Grove Beginner Kit including an Arduino. We received an astounding response from keen students in Years 10-13, with over 650 sign-ups in the first week. Since then, 450 kits have been sent out, with more planned.



Inside the Insight into Electronics kit box

#### Continued Success for Scholarship Scheme

The UKESF's relationship with sponsor companies is at the heart of our Scholarship Scheme, so it is reassuring to know that employer satisfaction remains exceptionally high. In a recent survey, 96% of respondents said that they would recommend the UKESF. Also:

- 96% said support from the UKESF was 'excellent' or 'good'
- 82% agreed that the UKESF is value for money
- 96% would recommend the UKESF
- 100% of new companies said joining the UKESF was straightforward

Written feedback included: "A very beneficial scheme which has attracted some very talented undergraduates" and "We had a higher proportion of female applicants through the UKESF compared to our direct intern programme, which proved to be valuable to us".

# **Activities & Partnerships**

#### Schools



Students using Music Mixers at Pendleton Sixth Form College, Salford

#### Electronics Everywhere

Electronics Everywhere, a partnership with the University of Southampton, shows young people how engaging Electronics can be. We provide specially designed circuit boards to teach core Electronics concepts to A-level students in Physics (the Music Mixer) and Computer Science (the Logic & Arithmetic Kit), along with CPD for teachers, free to state schools. Despite the constraints of the pandemic, we still sent out over 250 kits to schools in preparation for the new academic year, taking the total to 450 since the project began.

In October 2020 Electronics Everywhere was featured as an experience in new Engineering education initiative Neon, a website for teachers and careers advisors from the team behind Big Bang and Tomorrow's Engineers. Neon aims to inspire students through digital experiences and resources.



Many thanks to the Barbour Foundation and Cadbury Foundation for their donations to "Electronics Everywhere".







Still from the talk by Dr Sohini Dasgupta, Principal Design Engineer at onsemi

#### Girls into Electronics

In 2021 we held a "Girls into Electronics" course online (due to the pandemic), in partnership with The Smallpeice Trust, Aston University and Royal Holloway, University of London, with sponsorship from onsemi. Virtual attendees (girls in Year 12) explored what it is like to study Electronics/Engineering at university and to work as an Engineer in the Electronics sector, through a series of presentations, Q&A sessions and guided practical activities with microcontrollers.

Of the attendees, 25% were of an ethnic minority and 80% were from state schools. Feedback was very positive, with 85% stating that the course had persuaded them to seriously consider studying Engineering at university, and 80% saying that their interest in Engineering in general had increased after completing the course. The content of the course scored an impressive average of 84% approval, with the most highly rated sessions being 'Using Electronics to Solve Real-World Problems' and the Q&A with graduated female UKESF Scholars.

#### Feedback from Girls into Electronics virtual course attendees

"I am thankful for everyone who spoke on the course, the people who supported us and the kit provided to us as I learnt a lot from it! It was a refreshing experience and has really made me consider studying Electronics at university."

"I'd just like to thank everybody involved in this course. I honestly would have never thought of Electronics as something that I could do without this. Thank you so much!"

# onsemi

#### Undergraduates

#### Diversity & Inclusion

We have 26 partner universities right across the UK, and continue to attract high-quality students from these leading universities. Of the Scholarships we have awarded over the last six years:

- 14% were female
- 21% were BAME
- 73% were state sector educated
- 23% were the first in family to go to university

In 2020 we also pledged our support for Tomorrow's Engineers Code, a commitment among the signatories to work towards common goals to increase the diversity and number of young people entering engineering careers. Being collaborative is one of our core values, and we understand that a more joined-up approach and working collectively will be beneficial to help young people understand what engineering is, how to get into it, and be motivated and able to access the educational and training opportunities on the way.

Scholar Feedback, 2021

"The UKESF has been really helpful to me – the bursary is of course lovely, but the work placements were incredibly valuable and the Workshop taught me new stuff!"

#### Scholarship Scheme

Despite the challenges caused by the pandemic, we were delighted to report another successful year for our Scholarship Scheme. Seven new sponsoring companies joined the Scheme, taking the total number offering scholarships to 36 for the 2020/21 round of applications. We also welcomed two new partner universities: the University of Liverpool and King's College London, meaning that our companies are able to connect with even more high-quality students.

This year, 64 Scholarships were awarded to Electronics undergraduates at partner universities, up from 59 last year. All applicants were able to apply for up to four of the 36 leading companies in the Electronics and Engineering sectors offering our Scholarships. Each Scholarship includes a bursary, a paid summer work placement and a paid-for place at our residential workshop, among other benefits.

Scholar Feedback, 2021

"I have found the Scheme very beneficial and it has contributed both to my studies and future career."



Scholar of the Year Award finalists (L-R) Emily Wayland, Airam Perez Guillen and Oana Lazar

#### Scholar of the Year Award

Scholar of the Year 2020 was awarded to Emily Wayland (Southampton/Arm), who received £500, with Airam Perez Guillen (Manchester/EDA Solutions) named runner up and receiving £250. The top entries this year were closely matched, and for the first time the judges decided to additionally award a high commendation to Oana Lazar (Southampton/UltraSoC) for her entry. Kindly sponsored by IC Resources, the award celebrates Scholars who have made a significant contribution during their work placement and who have actively promoted Electronics to young people. Emily has just graduated and accepted an offer to work at her sponsor company, Arm, while Airam and Oana both graduate in 2022.

#### Emily Wayland, Scholar of the Year, 2020

"I am so grateful that I have been able to share my passion for Electronics with school students and to inspire the next generation of engineers, particularly girls who are interested in STEM ... I feel so proud to be recognised not only for my academic achievements, but also for my contributions to my university community and to the promotion of Electronics, both of which have been such an important part of my four years at university. I never expected to win this award, but it has been such a boost to my confidence and will really help to kickstart my professional career!"

#### Scholar Workshop

Regarded as a highlight of our Scholarship Scheme, we unfortunately had to cancel our 2020 Scholars' Workshop due to the pandemic. The Workshop encourages both personal and professional development, is delivered by a team of renowned facilitators, and consistently receives overwhelmingly positive feedback. We are looking forward to running it once again in September 2021.

#### Automotive Electronics Competition

The winner of the Automotive Electronics Competition for 2020 was Suzanne Candanedo (Warwick), who received £1,000 prize money, with runner-up Oana Lazar (UKESF Scholar, Southampton/ UltraSoC) receiving £500. The competition was run in partnership with AESIN and with generous support from UltraSoC, and required entrants to write a short 'think piece' on the future of cyber security for connected and autonomous vehicles. Aileen Ryan, Chief Strategy Officer, UltraSoC, said, "I've been really impressed not just with the number but also the quality of the entries to this year's competition. It's great to know that the emerging generation of engineers show such awareness and insight into the issues facing the automotive industry, and the socio-economic impact of our activities as engineers."

# Suzanne Candanedo (Warwick), Automotive Electronics Competition winner

"It was fun sharing my thoughts and reflections on the future of cybersecurity in autonomous vehicles. Hopefully, those who read it found themselves reflecting on something new too! This award was a fantastic way to end my undergraduate career and culmination of my aggregated experiences."



Suzanne Candanedo



Oana Lazar

#### Embedded Systems Competition

Having received considerably more entries than in 2019, the judges selected Jack Sampford (Loughborough) to be the winner of the 2020 Embedded Systems Competition and receive £1,000, with runnerup Richard Carter (Southampton) receiving £500. The competition highlights excellence in students completing their major individual project on embedded systems; entrants were required to submit an A1 poster summarising their projects. Jack and Richard's project were titled 'Exploration of Embedded Cryptography for NoC-Based Multi-Core Architectures' and 'Development of Bicycle Wheel Mounted Persistence of Vision (PoV) Display' respectively.

#### Richard Carter (Southampton), Embedded Systems Competition runner-up

"I thoroughly enjoyed designing and working on my project so the opportunity to be recognised for the success I achieved is especially rewarding. As with many embedded systems, there are many things from my project that I would like to improve on, and I have already started working on the next iteration of my PoV Bike Wheel Display. My thanks go to UltraSoC and UKESF for sponsoring, organising, and judging the competition."



Jack Sampford



**Richard Carter** 



Dialog Award recipients Lubabah Hossain (left) and Emma Onah (right)

#### Dialog Award for Female Undergraduates

A collaboration with our long-standing corporate partner Dialog Semiconductor and with The Smallpeice Trust, this award is for female undergraduates who are commencing the first year of their studies on Electronics-related degree courses. The 2021 recipients Lubabah Hossain (Durham) and Emma Onah (Cambridge) will be supported with a bursary, a paid summer work placement at Dialog and student membership of Women's Engineering Society (WES) for the duration of their degree.

#### Lubabah Hossain (Durham), Dialog Award recipient

"Wanting to go into a profession that is very male dominated, as well as studying at a competitive university, it is very easy to develop feelings of imposter syndrome. This award, however, has instilled me with a lot of confidence in myself, which I imagine will only be further reinforced when doing my placement over the summer with Dialog Semiconductor. The placement will also allow me to gain further clarity on what sort of field and position I would like to work at upon graduating, which to me feels like a vital insight."



RF Eng & Comms Competition finalists (L–R) Matthew Bridges, Jessica Abbey Kelly and Tom Moody

#### **RF Engineering & Communications Competition**

This annual competition, run in partnership with the Radio Communications Foundation (RCF) and with support from Leonardo, showcases the work of students at UKESF partner universities who are focusing on RF engineering and communications in their final year. The 2020 round saw many more entries than anticipated in light of the pandemic, but the judges were unanimous in their decision to award first place to Matthew Bridges (UKESF Scholar, Surrey/SEA) for his outstanding project, '8×8 MIMO Antenna Design for 5G Sub 6GHz Smartphone Applications', summarised on a poster for entry to the competition. Matthew received £1,000, with two runners-up receiving £500 each: Jessica Abbey Kelly (Loughborough) and Tom Moody (Southampton).

# Matthew Bridges (UKESF Scholar, Surrey/SEA), RF Eng & Comms Competition winner

"When I first spoke to my supervisor about this project, I would never have imagined the opportunities that would come from it. Getting the chance to learn about new innovative technologies that are shaping the future of 5G communications was exactly why I chose to do Electronic Engineering at the University of Surrey. Taking this project from the requirements all the way to validating the prototyped measured results against those obtained in simulation and modelling made it the highlight of my degree.

"As a UKESF Scholar, I have seen the help and support that the UKESF provides to Electronic Engineers in their degree. This competition is another example of what this Foundation offers and for that, I am enormously grateful. Receiving these opportunities and the Scholarship during my degree only furthers my enthusiasm to pursue a career in this field which I know I will find both really interesting and rewarding."

#### Skills 4 UK Scholar's Award

The recipient of the 2020 Skills 4 UK Scholar's Award was Lydia Moore (Southampton/AWE), who benefitted from a place on Skills 4 UK's award-winning Career Development Programme, as well as additional coaching. The award is open exclusively to final-year female scholars and takes into account academic performance, placement feedback and STEM-awareness contribution. Lydia graduated this year and now works in the Command and Control Department of MBDA Systems.

#### Lydia Moore, Skills 4 UK Scholar's Award winner 2020

"Throughout the 20-months experience I've accumulated with my sponsoring company through the UKESF, I've met and worked alongside so many inspirational, female leaders in both STEM and the wider industry. They've all pushed me to be the best that I can be, showing me what I can accomplish during my career. Therefore, this Skills 4 award and subsequent developmental course will be invaluable. I hope to learn vital tools that will help me in achieving my career goals, to become a leader like those I've met, and to increase my self-confidence. I can't wait to start!"

#### WES Student Conference

For the fifth year running, we supported our final-year female Scholars to attend the annual Women's Engineering Society (WES) Student Conference in November 2020, with places kindly sponsored by Enigma People Solutions. Hosted online for the first time, the conference brought together students, academics and young engineers, providing an opportunity to network and learn together.

#### Emily Wayland (Southampton/Arm), WES Student Conference attendee

"These events are great for connecting women so that we can share our experiences of studying and working in a very predominantly male field. I found it motivating to hear that women who are now at the top of their field have followed similar paths to me and that one day I could follow in their footsteps. These events provide women student engineers with helpful advice and skills for applying to jobs and internships and emphasise the importance of our applications to create diverse teams of engineers."

## **Communications & Engagement**



## **Income & Expenditure**

Income 2020/21 (2019/20)

Sponsorship, Grants and Donations – £34,422 (£145,424) Scholarship Scheme (bursaries, management fees and workshop fees) – £263,650 (£298,201) Total income = £298,072 (£444,923)

Expenditure 2020/21 (2019/20)

Charitable activity costs – £172,278 (£293,413) Administration costs – £117,754 (£149,439)

# With Thanks To...

The UKESF Steering Board and our Trustees:

Prof Bashir Al-Hashimi CBE FREng, Rupert Baines, Dr Derek Boyd, Neil Dickins, Heather MacDonald, Dr Graeme Philp, Darren Race and Lynn Tomkins.

Indro Mukerjee for his leadership and chairmanship.

All the scholarship-sponsoring companies and all of our Partner Universities.

All the organisations that we have collaborated with:

TechWorks, IC Resources, Skills 4 Ltd, ThinkEleven, The Radio Communications Foundation, The Smallpeice Trust, Women's Engineering Society, Enigma People Solutions and Mathys & Squire.

Special thanks to the following companies for their donations this year: Arm, AWE, Dialog Semiconductor and Qualcomm.



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

Stew Edmondson, CEO, UKESF

# **Our Strategic Priorities**

The purpose of the UKESF is to tackle the skills shortage in a coherent way. Our aim is to:

"Encourage more young people to study Electronics and to pursue engineering careers in the sector."

To achieve the aim, we have four strategic priorities:

- Ensure more schoolchildren are **aware** of Electronics. Show these children, their parents and teachers that there are exciting and worthwhile careers available as designers and engineers in the Electronics sector.
- With our partners, provide opportunities for them to develop their **interest** in Electronics and engineering, through to university study and/or apprenticeship.
- At university, ensure that undergraduates are encouraged to pursue careers in the Electronics sector and they are supported in their professional **development** so when they graduate they are equipped with work-ready skills and experience.
- After graduation from university, we will help create a community of Electronics engineers to secure the future pipeline. We will **build relationships** and act as the representative voice for the sector on skills.



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