Parliamentary and Scientific Committee Showcases Britain's Future

Scientists Engineers Technologists Mathematicians

On Monday 9th March 2020, 180 early career researchers from universities and research institutions from across the United Kingdom came to Westminster to take part in STEM for Britain, the annual poster competition and exhibition organised by the Parliamentary and Scientific Committee and designed to encourage interaction with MPs and Parliament.

During the course of the day these scientists, engineers, technologists and mathematicians had the opportunity to show their posters and explain their research to over 70 Parliamentarians from both Houses.

The competition comprised of five specialist sections: Biological and Biomedical Sciences; Chemistry, Physics, Engineering, and Mathematical Sciences.

Gold, Silver and Bronze winners in each category received certificates and cash prizes, with medals going to the Gold winners.

For the first time Dyson Ltd, IEEE Communications Society and the Nutrition Society presented special prizes.

The Physiological Society Prize was awarded for the second year running.

At the end of the day the winners of the five Gold medals competed for the Westminster Medal in memory of Dr Eric Wharton, founder of STEM for Britain. Here, with the quality of the science already ready proven with a Gold medal, the judges had to decide which of the five posters best demonstrated the presenter's skill in communicating the scientific concept.

Judging panels for each category were formed of distinguished scientists, engineers and mathematicians from the Royal Academy of Engineering, the Royal Society of Chemistry, the Institute of Physics, the Royal Society of Biology, the Council for the Mathematical Sciences, The Physiological Society and the Nutrition Society.

The judges' initial task had been to select the 180 posters for the exhibition and final of the competition from nearly 400 high quality entries.

The event is a two-way process designed to strengthen the dialogue between Parliament and the science, technology, engineering and mathematical communities.

STEM for Britain would not be possible without the help of all the major learned societies involved in organising the event, especially the Royal Academy of Engineering, the Royal Society of Chemistry, the Institute of Physics, the Royal Society of Biology, the Council for the Mathematical Sciences, The Physiological Society and the Nutrition Society.

And also the organisations which have generously supported the event, including the Clay Mathematics Institute, Warwick Manufacturing Group, Dyson Ltd, Biotherapy Services Ltd, UK Research & Innovation, the Institute of Biomedical Science, the Heilbronn Institute for Mathematical Research, The Comino Foundation, the Biochemical Society, IEEE Communications Group, and the Society for Chemical Industry.

However, the researchers who exhibited and displayed their work are the true 'engine room' of R&D. The success of the UK in the competitive knowledge economy of the 21st Century is going to depend crucially on their expertise.

The support of a number of important organisations is vital for STEM for Britain…

UK Research and Innovation

"UK Research and Innovation is delighted to support STEM for Britain. Early-career researchers play a hugely important role in the UK's world leading research and innovation ecosystem. Through our range of funding and fellowships, we are building inspiring, sustainable and flexible pathways within and between research and innovation careers at all levels, enabling talented people oeuvre careers across sectors. I have experienced STEM for Britain in my academic career and have seen for myself the remarkable people and their ideas that will create future technologies and innovations for UK and global society."

Professor Rory Duncan, Director of Talent and Skills at UK Research and Innovation

WMG THE UNIVERSITY OF WARWICK

"WMG was delighted to sponsor the STEM for Britain engineering awards for 2020. Britain needs an economy built on technical innovation, improved productivity and long-term investment, it is crucial therefore that we support innovative research which has the potential to change the way we live.

At WMG, we have focused on the practical applications of the highest quality scientific research for four decades, driving innovations in fields as diverse as battery technology and healthcare. Today more than ever sustainability is important, this is a key strength of WMG and one which our academics and engineers are at the forefront of research ensuring the environment and society benefits from our advancements.

In the future, the engineers presenting today can make a similar impact on our society."

Margot James, Executive Chair at WMG, University of Warwick

dyson

"Our products are the largest impact we have, and therefore our biggest opportunity. To be successful everyone needs to embed the principles of sustainability throughout the business. This is our challenge. Everyone's ideas needed. With that in mind, we are proud to sponsor STEM for Britain and to offer a new award, a prize for outstanding research towards a more sustainable future. Alongside this, we seek to inspire the next generation of engineers to help us make a positive impact and to help solve some of the biggest problems that the world is facing."

Dr Julian Rose, External Research Manager, Dyson Ltd

Heilbronn Institute for Mathematical Research

"As a Research Institute whose focus is on fundamental mathematics and its applications to UK national interests, and on supporting mathematical research across the country, HIMR is delighted to be associated with STEM for Britain and offers its warmest congratulations to all of the Award winners."

Professor Jon Keating FRS, Chair Heilbronn Institute for Mathematical Research.

IBMS Institute of Biomedical Science

"The Institute of Biomedical Science is proud to sponsor STEM for Britain which is an excellent opportunity for biological and biomedical scientists to showcase their research and raise awareness of their valuable work to politicians and the public."

Allan Wilson, IBMS President

CMI

"The inclusion of mathematics in STEM for Britain recognises the vitality and strength of the discipline in the UK and the huge part that all branches of mathematics play in underpinning science and technology."

Professor Martin Bridson, President, Clay Mathematics Institute

biotherapy services

"STEM for Britain is one of the most exciting platforms to showcase new and aspirant talents from the field of science, technologies, engineering and mathematics. Attending the various fora and sponsoring a key award, I was struck by the calibre of talent and enthusiasm that UK PLC can derive huge benefit from. As an entrepreneur I encourage participants to be bold in developing 'real world' applications and solutions for their research endeavours and reach out to dynamic innovative companies that will value your talents and allow you to expand your expertise to make a real difference in this interconnected world!"

Janet Hadfield, CEO, Biotherapy Services Ltd

"SCI's charitable objective is to bring together chemistry-related sciences and industry to promote applied science for the benefit of society.

The current global challenges we face are significant and complex and require a collaborative, multi-disciplinary and innovative approach.

Supporting early-stage and early-career research scientists, engineers, and technologists is an essential part of that mission.

SCI is proud to be part of STEM for Britain and to support the work of past SCI member, Dr Eric Wharton, who initiated the event's forerunner, SET for Britain in 1997."

Sharon Todd, Executive Director, SCI

"The Comino Foundation is an educational charity that focuses on creativity, science and engineering mostly at primary and secondary school level. We are particularly concerned about the ability of the current education system to provide the right skills for the digital age and also to develop creativity and 'making' as crucial parts of this. Many of the creative subjects are being dropped by secondary schools and as a result those joining the workforce for the first time struggle with problem-solving and developing initiative. STEM for Britain demonstrates for us the need for these skills to be at the forefront of our emerging workforce if this country is to succeed in the future."

John Slater, Chairman

IEEE UK and Ireland Section, Communications Chapter

The IEEE is the world's largest professional organization with members and activities from all areas across the Science, Technology, Engineering and Mathematics spectrum.

It was our great pleasure to be present at this very important, inspiring and enabling event to meet and talk to so many brilliant participants that were energetically supported by not just academia, but industry as well as the political body and policy makers. We are very happy to have seen so many of the UK's future leaders in our profession who will be the drivers of the UK economy, being recognized and rewarded.

Congratulations to all who participated and we look forward to increasing the IEEE's visibility and sponsorship at the next STEM for Britain event.

Prof Izzet Kale, Vice Chair, IEEE UK & Ireland Section and Dr Hoa Le-Minh, Chairman, IEEE Communications Society.

Dr John Chiplin, Chairman, Biotherapy Services Ltd (Sponsor of the Chemistry Awards); Dr ThaoNguyen Nguyen, Scientific Affairs Manager, Biotherapy Services Ltd and STEM for Britain Alumnus; Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; and Ms Janet Hadfield, CEO, Biotherapy Services Ltd

Gemma Smith, University of Manchester (Winner of the Best Tweet in the First Session) and Ms Doris-Ann Williams MBE, CEO BIVIDA, and Chair of the STEM for Britain Organising Committee

BIOMEDICAL AND BIOLOGICAL SCIENCES EXHIBITION

The STEM for Britain 2020 Awards:

Gold Award: Sarah HOUSTON
Institute of Ophthalmology, University College London
USING THE EYE AS A WINDOW TO THE BRAIN IN MULTIPLE SCLEROSIS

Silver Award: Karoliina TUOMELA
Lydia Becker Institute of Immunology, University of Manchester
RADIOTHERAPY CAN MAKE CANCER CELLS RESISTANT TO IMMUNE CELL ATTACK

Bronze Award: Ted ROBERTS
School of Biochemistry, Biomedical Sciences, University of Bristol
CULTURING NEUTROPHILS FROM STEM CELLS TO EXPLORE NEUTROPHIL CELL BIOLOGY AND DISEASES

The Nutrition Society Prize: George FIRTH
Biomedical Engineering and Imaging Sciences, King's College London
PET METALLOMICS - USING RADIOACTIVITY TO TRACK ESSENTIAL TRACE METALS IN THE BODY

The Physiological Society Prize:
Egzona MORINA
Sainsbury Wellcome Centre, University College London
CHARACTERISATION AND CIRCUIT ANALYSIS OF POSTURAL ADJUSTMENTS IN MICE

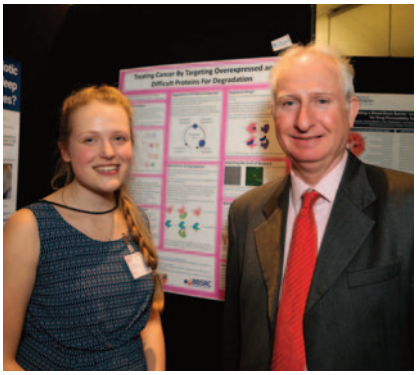
Dr Dominika Gruszka, Trustee & Chair, Early Career Advisory Panel, Biochemical Society (Bronze Award Sponsor); Dr Mark Downs, Chief Executive, Royal Society of Biology, Allan Wilson, President, Institute of Biomedical Science (Gold and Silver Award Sponsor); **Ted Roberts** (Bronze Award Winner); Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee; **Sarah Houston** (Gold Award Winner); Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; **Karoliina Tuomela** (Silver Award Winner); Professor David Paterson, President-Elect, The Physiological Society; Mark Hollingsworth, Chief Executive, Nutrition Society

The Physiological Society Prize
Professor David Paterson, President-Elect, The Physiological Society; Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; **Egzona Morina** (The Physiological Society Prize Winner); Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee

Nutrition Society Prize
Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee; Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; **George Firth** (Nutrition Society Prize Winner); Mark Hollingsworth, Chief Executive, Nutrition Society

Our sincere thanks to the **Institute of Biomedical Sciences** for generously supporting the Biosciences Gold and Silver Awards and to the **Biochemical Society** for supporting the Bronze Award and to Allan Wilson, President, IBMS and Dr Dominika Gruszka, Trustee, Biochemical Society, for presenting the awards along with Dr Mark Downs, Chief Executive, Royal Society of Biology, Mark Hollingsworth, Chief Executive, the Nutrition Society, and Prof David Paterson, President-Elect of The Physiological Society.

We are also grateful to the Panel of Biosciences Judges for their work: Professor Alyson Tobin (Chair), Professor Malcolm Bennett, Dr Guy S Bewick, Dr Simon Cork, Dr Bernard Corfe, Professor Phil Gilmartin, Dr Sarah Hall, Dr Celia Knight, Professor Raheela Khan, Dr Kevin O'Dell, Dr Sarah Pitt, Dr Mark Roberts and Professor Chris Seal.



Sian Stockton, University of Cambridge, with Daniel Zeichner MP

ENGINEERING EXHIBITION

The STEM for Britain 2020 Awards:

Gold Award: Tomas YSEHAK ABAY
School of Mathematics, Computer Sciences and Engineering, City, University of London
DEVELOPMENT OF A NON-INVASIVE INTRACRANIAL PRESSURE (NICP) MONITOR FOR NEUROCRITICAL CARE PATIENTS

Silver Award: Elisa ROCCIA
Biomedical Engineering Department, King's College London
THREE-DIMENSIONAL CANCER RISK SCORE MAPPING WITH MAGNETIC RESONANCE IMAGING TO IMPROVE EARLY DETECTION AND INDIVIDUALISED TREATMENT PLANNING FOR MEN WITH PROSTATE CANCER

Bronze Award: Benjamin CERFONTAINE
School of Science and Engineering, University of Dundee
OPTIMISATION OF SCREW ANCHOR DESIGN FOR OFFSHORE FLOATING WIND, WAVE AND TIDAL ENERGY DEVICES

The Dyson Award for outstanding research towards a more sustainable future: Andrés RIVERO BRACHO
Bristol Composites Institute, University of Bristol
FLEXIBLE AIRPLANES? - ACHIEVING HIGHER FUEL EFFICIENCY BY CONTINUOUSLY ADAPTING WING GEOMETRY

IEEE Communications Society Prize:
Benjamin FLETCHER
Department of Electronics and Computer Science, University of Southampton
3D INTEGRATION USING WIRELESS INDUCTIVE LINKS - CAN WE MAKE STACKING SILICON AS EASY AS STACKING LEGO?

Benjamin Fletcher (IEEE Communications Society Award Winner); Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee; **Benjamin Cerfontaine** (Bronze Award Winner), **Tomas Ysehak Abay** (Gold Award Winner); Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; **Elisa Roccia** (Silver Award Winner); **Andres Rivero Bracho** (Dyson Award for Outstanding Research Towards a More Sustainable Future)

Dr David Bott, Principal Fellow, Warwick Manufacturing Group, Sponsor of the Engineering prizes

Lois Afua Okerewaa, The Open University and Bel Ribeiro-Addy MP

Rt Hon Greg Clark MP, Chair of the Science & Technology Select Committee and Omayma Alqatawneh, University of Huddersfield

Jasper James, University of the West of England, and his Mother, Dr Sarah Wollaston, former Chair of the Health & Social Care Select Committee

Our sincere thanks to **Warwick Manufacturing Group** for generously supporting the Engineering Awards and Dr David Bott, Principal Fellow, WMG.

Dyson Ltd for generously sponsoring the Dyson Award and Tom Crawford, Global Director, Corporate, Social & Environmental

IEEE Communications Society for sponsoring the IEEE Communications Society Prize, and Prof Izzet Kale, Vice Chair IEEE.

We are also grateful to the Panel of Engineering judges for their work: Professor Mary P Ryan (Chair), Professor Bashir Al-Hashimi, Dr Donal Cronin, Professor Brian G Falzon, Professor Colin Garner, Professor Jeff Magee, Professor Mark Sandler, Professor Ravi Silva, Professor Paul Shearing, Professor Constantinos Soutis, and Professor Robert J K Wood.

MATHEMATICAL SCIENCES EXHIBITION

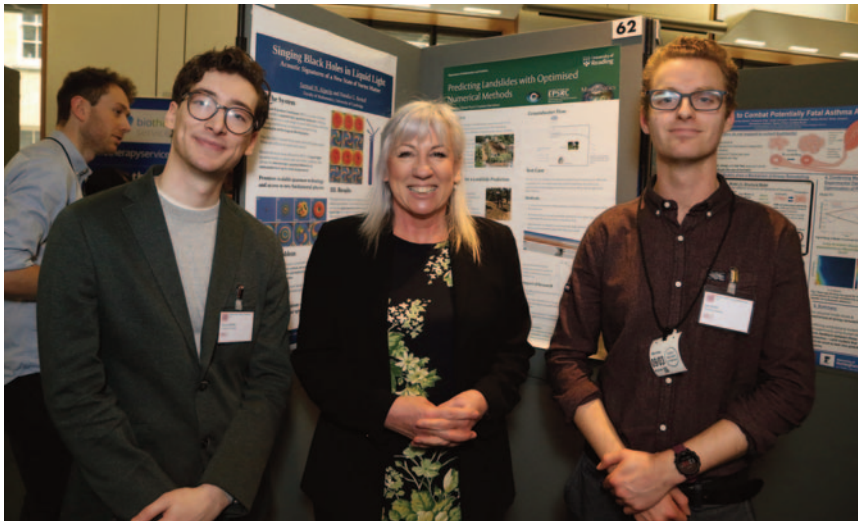
The STEM for Britain 2020 Awards:

Gold Award: Luiza Mihaela PAUN
School of Mathematics and Statistics, University of Glasgow
PARAMETER INFERENCE AND UNCERTAINTY QUANTIFICATION IN THE PULMONARY CIRCULATION

Silver Award: Adrien LEFAUVE
Department of Applied Mathematics and Theoretical Physics, University of Cambridge
FINDING STRUCTURES IN THE CHAOS OF STRATIFIED TURBULENT FLOWS

Bronze Award: Damian GALANTE
Department of Mathematics, King's College London
QUANTUM EMERGENCE OF EXPANDING SPACETIMES

Dr Nira Chamberlain, President, Institute of Mathematics and its Applications; **Adrian Lefauve** (Silver Award Winner); **Luiza Mihaela Paun** (Gold Award Winner); Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; Professor Martin Bridson, President, Council for Mathematical Sciences (Gold and Silver Award Supporter); **Damian Galante** (Bronze Award Winner); Professor Jon Keating, Chair, Heilbronn Institute for Mathematical Research (Bronze Award Supporter); Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee



Samuel Alpern, University of Cambridge, Amanda Solway MP, Minister for Science, Ben Ashby, University of Reading

Our sincere thanks to the **Clay Mathematics Institute** for generously supporting the Gold and Silver Awards and the **Heilbronn Institute of Mathematical Research** for supporting the Bronze Award, and to Prof Martin Bridson, President of the Clay Mathematics Institute, and Dr Nira Chamberlain, Council for Mathematical Sciences, for presenting the prizes.

We are also grateful to the Panel of Mathematical Sciences Judges for their work: Professor Tim J Pedley (Chair), Professor Martin Bridson, Professor Steven Gilmour, Dr Vincent Knight, Professor Elizabeth Mansfield, and Professor Demetrios Papageorgiou.

Josephine Solowiej-Wedderburn, University of Surrey and Neil Coyle MP

Thomas Wilder, University of East Anglia and Clive Lewis MP

Fatumah Atuhaire, University of Southampton, and Caroline Nokes MP

PHYSICAL SCIENCES EXHIBITION – CHEMISTRY

The STEM for Britain 2020 Awards:

Gold Award: Florence GREGSON
School of Chemistry, University of Bristol
SPHERES OR CUBES - HOW DO SALT DROPLETS DRY?

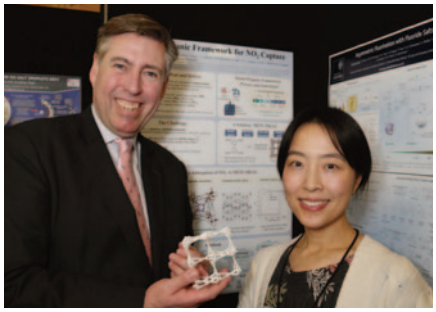
Silver Award: Fabienne BACHTIGER
Computational Chemistry, University of Warwick
UNRAVELLING THE MICROSCOPIC DETAILS OF ICE FORMATION AND PREVENTION IN BIOLOGICAL MATTER

Bronze Award: Gemma SMITH
Department of Chemistry, University of Manchester
STABLE MICROPOROUS MATERIALS FOR REVERSIBLE CAPTURE OF SULFUR DIOXIDE

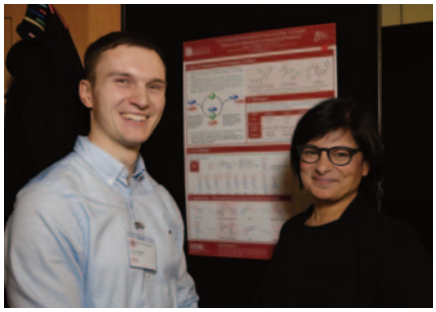
Janet Hadfield, CEO, Biotherapy Services Ltd, Awards Sponsor, **Gemma Smith** (Bronze Award Winner); Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; Dr Jo Reynolds, Director of Science and Communities, Royal Society of Chemistry; **Florence Gregson** (Gold Award Winner); **Fabienne Bachtiger** (Silver Award Winner); Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee

Our sincere thanks to Dr Jo Reynolds, Director of Science and Communities, Royal Society of Chemistry and Ms Janet Hadfield, CEO Biotherapy Services Ltd, for presenting the prizes.

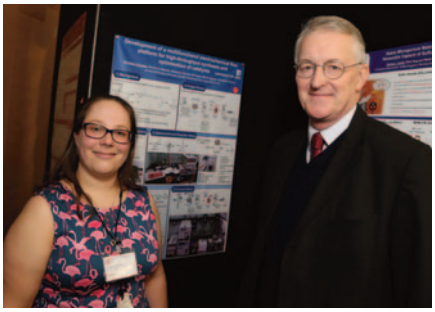
We are also grateful to the Panel of Chemistry Judges for their work: Dr Peter J Machin (Chair), Professor Paul M Cullis, Professor Helen Fielding, Dr Bryan Hanley, and Professor Peter Knowles.



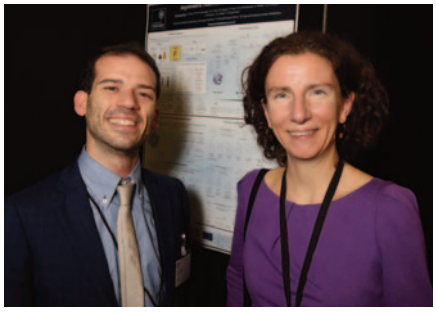
Sir Graham Brady MP and Xue Han, University of Manchester



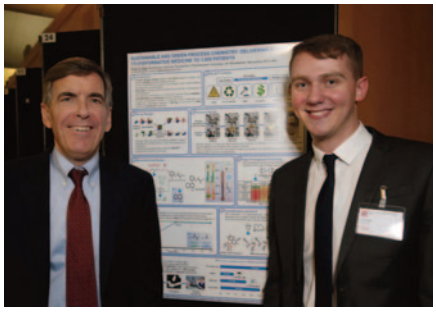
Benjamin Rowsell, University of Bristol and Thangam Debbonaire MP



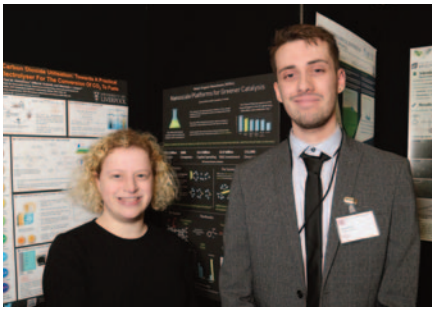
Christiane Schotten, University of Leeds and the Rt Hon Hilary Benn MP



Francesco Ibba, University of Oxford and Anneliese Dodds MP



David Rutley MP and Oliver Ring, Astra Zeneca



Joshua Nicks, University of Sheffield and Olivia Blake MP

PHYSICAL SCIENCES EXHIBITION – PHYSICS

The STEM for Britain 2020 Awards:

Gold Award: Lui TERRY
Mechanical Engineering, University of Bristol
CONFINING HYDROGEN: A LOW ENERGY ROUTE TO ROOM TEMPERATURE SUPERCONDUCTIVITY

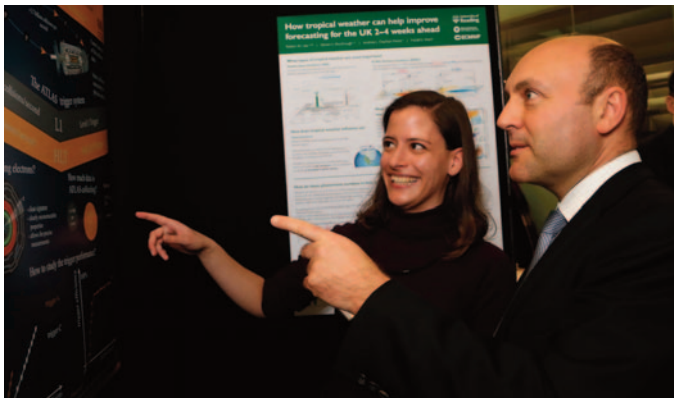
Silver Award: Graham BRUCE
School of Physics and Astronomy, University of St Andrews
MAKING THE MOST OF INTERFERENCE: PRECISION MEASUREMENTS OF LASERS USING SPECKLE

Bronze Award: Maeve MADIGAN
Department of Applied Mathematics and Theoretical Physics, University of Cambridge
LEPTOQUARKS AT FUTURE COLLIDERS

Dr Tamara Clelford, Trustee, Institute of Physics; **Maeve Madigan** (Bronze Award Winner); **Lui Terry** (Gold Award Winner); Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; **Graham Bruce** (Silver Award Winner); Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee

Our sincere thanks to Dr Tamara Clelford, Trustee, Institute of Physics, for presenting the prizes.

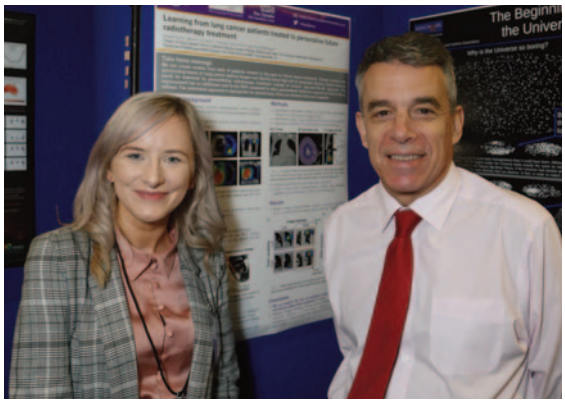
We are also grateful to the Panel of Physics Judges for their work: Dr Mark Telling (Chair), Dr Ceri Brenner, Dr Olivia Keenan, Professor Tara Shears, and Dr Klaus Suhling.



Daniela Koeck, University of Sussex, and Andrew Griffith MP

Adam Forrest, Heriot Watt University and Joanna Cherry MP

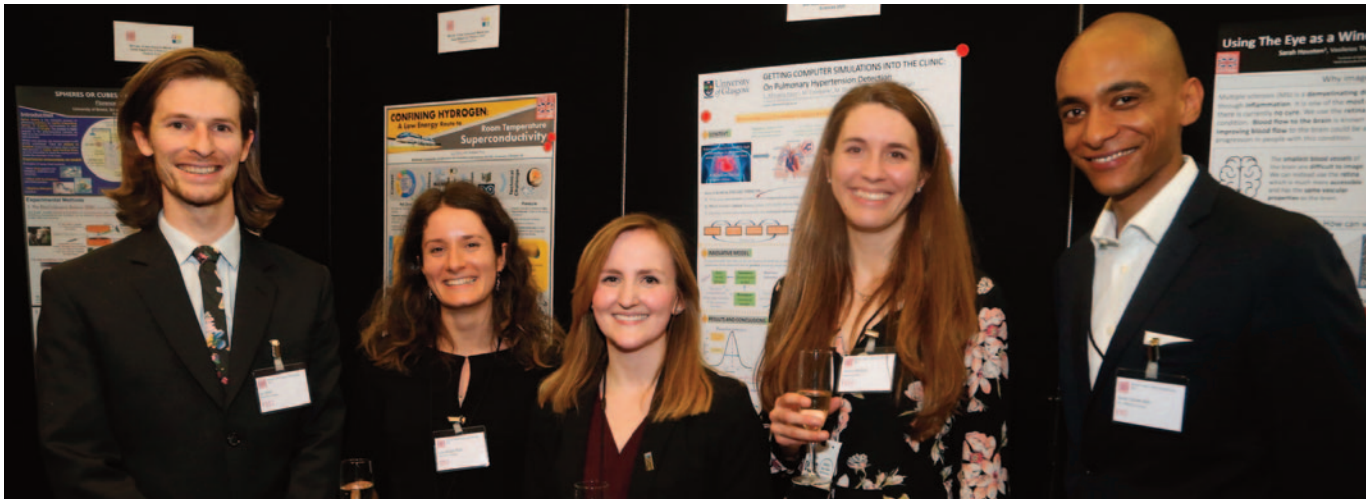
Philip Heron, Durham University and Amanda Solway MP, Minister for Science



Angela Davey, University of Manchester and Jeff Smith MP

THE WESTMINSTER MEDAL

The finalists…



Lui Terry, Gold – Physics; **Luisa Mihaela Paun**, Gold – Mathematics; **Sarah Houston**, Gold – Biosciences; **Florence Gregson**, Gold – Chemistry; **Tomas Ysehak Abay**, Gold - Engineering

At the end of the day, the winners of the five Gold medals competed for the Westminster Medal, in memory of Dr Eric Wharton, founder of STEM for Britain. Here, with the quality of the science already proven with a Gold medal, the judges decided on which of the five posters best demonstrated the presenter's skill in communicating the scientific concept.

And the winner was…SARAH HOUSTON
Institute of Ophthalmology, University College London
USING THE EYE AS A WINDOW TO THE BRAIN IN MULTIPLE SCLEROSIS

LR: Dr Sarah Main, Director, Campaign for Science & Engineering; Fred Parrett, Trustee, Society of Chemical Industry London Group (Westminster Medal Sponsor); Sue Wharton, STEM for Britain; Dr Stephen Benn, Vice-President, Parliamentary & Scientific Committee; **Sarah Houston** (Westminster Medal Winner); Stephen Metcalfe MP, Chair, Parliamentary & Scientific Committee

We sincerely thank **The Society of Chemical Industry** for generously supporting the Westminster Medal and are grateful to Fred Parrett, SCI Trustee, and Mrs Sue Wharton for presenting the award.

STEM for Britain is very much a team effort and would not be possible without the help of all the major Learned Societies involved…

Royal Society of Biology

"Clear communication is critical as we struggle to address the Covid19 global pandemic, underpinned by an effective explanation of the underlying science. The importance of science communication has always been at the heart of the STEM for Britain competition, but looking forward there can be little doubt that it will be seen as an essential skill sitting as an equal with research quality and integrity: explaining the value and importance of research to parliamentarians has become a critical component of policy making. Congratulations are due to all the entrants for such high quality work."

Dr Mark Downs,
Chief Executive of the Royal Society of Biology

The Nutrition Society – Advancing Nutritional Science

"The Nutrition Society is delighted to have participated in STEM for Britain 2020. This unique event continues to provide an exceptional opportunity for early career researchers in the fast-growing field of nutrition science to achieve wider exposure for their cutting-edge research projects through this interaction with Parliamentarians. The Society was particularly pleased to see STEM for Britain attracting a very positive level of support from within Parliament on the day. Finally, it was a landmark occasion for the Society being proud to have awarded the first STEM for Britain Nutrition Society prize at the event."

Mark Hollingsworth
Chief Executive Officer

IOP Institute of Physics

"STEM for Britain enables Members of Parliament to learn first-hand about new research from some of the very best early career UK scientists.

It is a splendid showcasing event, with a competitive element, that has taken place for many years and will, I hope, run for many more.

These kinds of events are invaluable in furthering everyone's knowledge of the ground-breaking work being undertaken by our young scientists. Policy makers and young researchers get to meet and swap ideas and knowledge.

All the exhibitors should be immensely proud of what they have achieved, and I am sure that they valued and enjoyed sharing the excitement of their research with key politicians and policy makers."

Jonathan Flint
President of the Institute of Physics

The Physiological Society

"STEM for Britain is one of the highlights of the parliamentary calendar. We are proud to support it and to present The Physiological Society Prize.

The world faces great challenges in the years to come that will not be addressed by science or politics alone, but by us working together for a common purpose.

For example, in the COVID-19 crisis, physiologists from our Society are working closely with frontline clinicians to analyse the data and help improve treatment options for the disease.

Events like STEM for Britain are vitally important for scientists and politicians to engage with each other on these key issues."

Professor Bridget Lumb,
President of The Physiological Society

Royal Academy of Engineering

"We are delighted to see young engineers bringing their research to Parliament, to meet their MPs and share their knowledge and research ideas with policymakers. The Academy believe that it is important that parliamentarians are aware of the advances that are being made and the potential for future economic and social benefit."

Professor Karen Holford CBE FREng FLSW,
Chair of the Royal Academy of Engineering Research Committee

The Council for the Mathematical Sciences

"It is wonderful to showcase the importance of the mathematical sciences to a wider audience. It is paramount to encourage early-career research scientists, engineers, technologists and mathematicians and the STEM for Britain event is a very effective way of doing this."

Dr Nira Chamberlain
Council for the Mathematical Sciences

Royal Society of Chemistry

"It's essential to have quality science informing policymaking – and that's why we're very pleased to once again support STEM for Britain. There is no other event quite like it to bring amazing chemical science research – and the people who work on it – into Parliament. Everyone presenting here is not only doing important scientific research but the equally important role of communicating it widely – an essential skill for future chemical science leaders."

Dr Jo Reynolds, Director of Science and Communities,
Royal Society of Chemistry

STEM for Britain 2021 is scheduled to take place in the Houses of Parliament in the second week of March during British Science Week

Applications are invited from Monday 14th September 2020 from early-career research scientists, engineers, technologists and mathematicians who wish to exhibit posters in one of the following five areas:

- Biological and Biomedical Sciences
- Chemistry
- Engineering
- Mathematical Sciences
- Physics

The closing date for applications is Monday 7th December.

A wide range of important scientific, engineering and mathematics institutions and organisations are lending their support to this event, including the Royal Society of Biology, The Physiological Society, the Royal Society of Chemistry, the Royal Academy of Engineering, the Council for the Mathematical Sciences, the Institute of Biomedical Science, the Clay Mathematics Institute, the Nutrition Society, the Heilbronn Institute, the Institute of Physics, Warwick Manufacturing Group, United Kingdom Research and Innovation, Dyson Ltd, Biotherapy Services Ltd, IEEE Communications Society, the Biochemical Society, and the Society of Chemical Industry.

This reflects the importance we all attach to the encouragement of researchers at this stage in their careers.

Prizes will be awarded for the posters presented in each discipline which best communicate high level science, engineering or mathematics to a lay audience.

The Westminster Medal for the overall winner will be awarded in memory of the late Dr Eric Wharton, who did so much to establish SET for Britain as a regular event in the Parliamentary calendar.

From 14th September full details of the competition and exhibition including the application form can be found on the STEM for Britain website at: **www.stemforbritain.org.uk**

Presenting our research at STEM for Britain

Jasmine and Hans are early career research scientists at the National Physical Laboratory (NPL), Jasmine is in the process of completing her Doctorate in Engineering with the University of Surrey working in NPL's Materials Testing group, and Hans is a Higher Research Scientist in NPL's Electrochemistry research group.

JASMINE BONE

I applied to take part in STEM for Britain as it is a great opportunity to present my research to a new audience, and emphasise its importance. This also enables me to continue to develop my own communication skills in presenting my work in poster form, as well as articulating research to non-experts. This is something that is definitely required more in science and engineering if we want to communicate the impact of research to the wider public! In addition to increasing my own opportunities for personal and professional development, I love attending events where I can also meet and network with other researchers and learn more about their work too. This is also a valuable chance to learn more about how research can translate to meeting wider government strategy in the UK.

Jasmine Bone winning her Champagne for best tweet

The process involved submitting a one page written abstract about the research, and successful applicants were asked to present their poster to MPs and judges at Westminster, with the opportunity to win cash prizes.

The poster presentation session itself involved speaking to poster judges and MPs throughout the afternoon about my research, as well as chatting to the other poster presenters involved. The judges were looking for clarity, brevity and enthusiasm about the work in addition to a good poster.

I presented my research on the durability of composites in marine environments. Polymer composite materials are increasingly being used in offshore and marine industries for subsea structures, shipping, and wind or tidal turbine blades; particularly as demand for renewable energy increases. While these materials are lighter weight and more corrosion resistant than steel for example, there is still an issue of environmental degradation. It is critical to understand the long term behaviour of these materials to ensure it is accurately designed for cost effective, safe, durable life. My research looks at how the materials that are used for wind turbines and subsea platforms break down under environmental conditions and how that degradation then affects the material performance. Understanding this process allows development of material assessment and the capability to design for long term durability in large composite structures; something of great interest to industry.

It was fantastic to talk to so many people about their research, as well as learn more about encouraging conversation between parliament and researchers.

While I didn't come away with one of the top prizes, there was an additional award for 'Tweet of the session' in the form of a bottle of champagne which I won! Using social media to promote STEM and interact with the science and research community is so valuable; it's great to see this being celebrated and I'm always happy to be an advocate for communication in research.

DR HANS BECKER

Last December, I submitted a one-page abstract of my research to join the STEM for Britain 2020 poster competition. It is a competition for Britain's young scientists to communicate their research to MPs in the UK Parliament. It is a rare opportunity to engage our research with the people who have the power to shape the UK's scientific direction. That's why I was very excited when I found out I got invited to present my poster in the Engineering session on the 9th of March.

It was a busy day in the Parliament when I arrived, with the MPs in another room discussing measures to tackle the yet-to-be-pandemic Coronavirus. The room was quite packed (which at the time was not yet an issue!) with young scientists all over Britain, each with their state-of-the-art research. My poster details our latest finding in the metrology of water electrolysers, the technology that powers a hydrogen refuelling station. I used a unique reference electrode system and found that expensive materials are feasible to be substituted with cheaper alternatives.

I shared my research with various visitors to my poster, ranging from industry representatives to fellow poster presenters. A few scientists there were also working in the same technology, and we ended up exchanging contact details for future correspondence. Munira Wilson, the MP for Twickenham and NPL's local MP, also stopped by and I had the chance to chat about hydrogen technologies with her. I didn't walk away with a prize, but the whole experience is already a prize on its own!


Left to right - Hans Becker, Munira Wilson MP for Twickenham and Jasmine Bone

What did the winners of STEM for Britain have to say?

"I am delighted to be awarded the Dyson Award for Outstanding Research towards a more sustainable future as it is a perfect match to what I'm trying to achieve with my research. Our research group led by Dr Ben Woods is researching in morphing wings (i.e. wings that can change shape during flight in a smooth and continuous way) and our end goal is to increase the aerodynamic efficiency of aircraft. By achieving these optimal wing geometries, we could reduce aircraft's fuel consumption and noise, which would directly translate into more sustainable and environmentally friendly aircraft."

Andres Rivero Bracho – The Dyson Award

"I thoroughly enjoyed taking part in STEM for Britain this year. This event provided a great opportunity to share my research with members of parliament, and importantly, with a wider non-scientific audience who wouldn't regularly engage with scientific research. The MPs I spoke to were highly interested in the novel research we do at King's College London in medical imaging with radioactive metals. I was honoured to receive the Nutritional society sponsored prize and will share this award with my friends and colleagues back in the lab."

George Firth – Nutrition Society Prize

"I am absolutely delighted to win the Cavendish Gold Medal for Physics. It is a real honour to receive such a prestigious award from Parliament and recognition for my work on hydrogen storage and superconductivity. It is a field I am passionate about, and know that one day we will be able to make real change against the climate crisis. It was great to be part of STEM for Britain. Events where both scientists and politicians can come together and discuss solutions to the burdens of the day are vital, and I hope to be able to attend lots more in the future."

Lui Terry – Physics Gold

"I'm over the moon! I never win anything and I've worked so hard for this, so I'm really, really pleased. I know of couple of people who have applied in the past who weren't successful but they said I should give it a go anyway to see, so I gave it a go and I was ecstatic to just be here – I didn't expect to win!

Being able to communicate what you do to lay people is really important for policymaking – it informs policy, it informs other people that might actually want to be involved but don't necessarily have that level of expertise – but you can make that accessible by explaining what you do at a more friendly, user-level."

Fabienne Bachtiger – Chemistry Silver

"STEM for Britain was a unique opportunity to raise awareness about our work and to champion the deployment of offshore technologies. Foundations are usually unnoticed because they are below the ground surface, but are still essential to ensure the integrity of any man-made structure. This event will enable me to share our results and my enthusiasm with people actually making the decisions. Beyond the simple and clear message of going carbon neutral in 2050, I think discussing my topic with the MPs will give them more information about the practical solutions, opportunities but also hurdles to clear to achieve this goal."

Benjamin Cerfontaine – Engineering Bronze

"I am delighted to have won the Gold award in STEM this year. This is an amazing event which enables early-career researchers to disseminate their work. I very much enjoyed discussing my poster with the MPs and I strongly encourage other researchers to participate."

Luisa Michaela Paun – Mathematics Gold

'Before I properly started my PhD, I initiated a project called 'BrainCamp Kosovo' that focuses on teaching high-school students in Kosovo about neuroscience. My institute, SWC, was more than happy to support it and so it has been running since 2018 every year. From here the motivation to do something more grew, and so I founded a charity last year (Xheladin and Xhufe Morina foundation – xhmfoundation.com) focused on providing funding for Kosovan high-school students to attend STEM workshops or courses to further their STEM careers. I myself am from Kosovo and was lucky enough to have grown up in Belgium, a country that gave me many opportunities to get to where I am today. Therefore, I always look for opportunities to support and participate in any endeavour like STEM for Britain, where scientists/researchers come together and share their 'sheer curiosity for the world around us'.

Egzona Morina, Winner, The Physiological Society Prize

"I am honoured to receive this award. I would like to thank both the judges and the organisers for setting up such an interesting event. I believe it is very important to have a space where scientist can share the beauty of what we do to the rest of the community. Finally, I would like to thank the Theoretical Physics group at King's College London and my collaborators, D. Anninos and D. Hofman, for taking me into this journey of understanding the fundamental structure of space and time."

Damian Galante – Mathematics Bronze

What does STEM for BRITAIN mean to me?

Dan Walker – 2005 Young Engineer for Great Britain Award Winner

From modelling the largest ocean waves on the planet, to delivering some of BP's most challenging oil and gas projects, Dan Walker has made a career out of chasing engineering challenges. And he's still chasing them in his current role – leveraging new technologies to help BP play a major role in the energy transition. Here, he talks about his passion for the job and the importance of having a global impact.

In many ways, I owe my BP career to the Parliamentary and Science Committee's STEM for Britain (SfB) programme.

I've always been fascinated with the way the physical world around us worked and as a child I had been good at maths and science. But my rural comprehensive school found it hard to show me how those subjects applied in the real world, so it was only out of curiosity that I discovered programmes like those run by the Royal Academy of Engineering that promoted engineering careers. They opened my eyes to the possibility of a career in engineering.

Later, my research on extreme ocean waves led me into graduate and postgraduate studies in mechanical engineering at both Oxford University and the Massachusetts Institute of Technology in the US. We started to build very accurate models and the oil and gas industry began to take notice. This is because if you can model these waves, you can start to look at the wave forces on their structures. And when you can do that then you can intelligently design offshore facilities which safely minimise the use of the concrete and steel. So, while I was in the academic world I worked on a number of projects with Shell, mainly in Russia and the US.

New career frontiers open up

Everything changed in 2005, though, when I won a gold medal for excellence in engineering and the Young Engineer for Great Britain Award at SfB. This second prize was sponsored by BP, so when at the awards event at the House of Commons, I met several of its senior executives at the time. One asked if I'd ever considered joining the industry full time. The rest, as they say, is history.

That said, I didn't join immediately. I actually went back to research and lecturing at Oxford for another year, but the appeal of going into industry and tackling the biggest frontier energy projects in the world was too great to ignore!

A year later I found myself working on BP's flagship oil and gas projects in some of the deepest water depths (great than 2km), with the highest temperature and pressure reservoirs, and in harshest environments like the Gulf of Mexico, where you can get 25-30-metre hurricane waves. We faced some of the biggest engineering challenges on the planet at the time. And I loved it.

A few years into my career at BP, though, the Deepwater Horizon accident happened. Because of my engineering background, particularly offshore, I was asked to join the team that ultimately capped and contained the well. I then led a global review into engineering risk across production and drilling for BP. Off the back of that, BP set up an industry taskforce, which I led, working with our peers to pool our resources and strengthen the way in which we collectively manage those risks.

Technology and the energy transition

My career took another, completely different, turn in 2015 when I was asked to set up BP's first ever cross-business emerging and disruptive technology team. A different kind of challenge, but a big one, nonetheless. We wanted to build understanding and capability in new technology areas – often from outside our industry – that have the potential to shape the energy sector in the future; technologies such as batteries and artificial intelligence. Essentially the role of this new team is to leverage new technologies that help BP play a major role in driving the energy transition.

As part of this work, I also lead the team that updates and publishes BP's Technology Outlook, which lays out our thinking on the role that technology might play in shaping the energy sector out to 2060. Not an easy task when the world around us is changing so rapidly! But understanding that potential impact helps us make informed choices about the direction of our company. And with the need to transition to a low carbon economy ever more urgent, that challenge has only got bigger in recent years.

My decision to move from our upstream oil and gas business into new technologies was a big step at the time – some found it quite surprising, but I knew I wanted to help with the energy transition. I have always been attracted by roles that present the biggest challenges – and they don't come much bigger than how to help society access the energy it needs while reducing our emissions. For me it's about doing work that I'm passionate about; in my experience that means a career in science and technology rarely travels in a straight line.

So, if I was to offer any advice to 15-year-old me, it would be this: be clear about what excites you. Ask yourself 'what am I passionate about?' and then focus on it like a laser. I'd say the same thing to anyone in an engineering career right now – if you're not genuinely passionate about what you're doing, try something else. Keep trying new things until you find the thing that sticks.