



Frontiers of Engineering for Development symposium:

The Circular Economy

Welcome Pack

Date: 30 April to 2 May 2018

Location: Royal Academy of Engineering, London, UK

#FoEDev @RAEngGlobal

Welcome from the Chairs

As Chairs, we are delighted to welcome you to the fifth Royal Academy of Engineering *Frontiers of Engineering for Development: The Circular Economy* symposium, with support from the Circular Economy Club (CEC)

You have been invited to this event because you are a future leader of your field. Your participation in this symposium will open doors to a global network of talented researchers and provide you with career opportunities. You are also joining a broader network of professionals who aim to make a real difference. We hope you will take this opportunity to talk, share ideas and explore interdisciplinary approaches to address grand challenges faced by our planet.

Engineering and technology can contribute to addressing the world's most pressing development challenges, from provision of essential water and energy services, to enhancing resilience to natural hazards and opening up opportunities for trade and growth. This symposium aims to promote international development, encourage collaborative work and facilitate cross-disciplinary thinking among the next generation of engineering leaders.

Challenge-led research at the frontiers of traditional disciplines is particularly likely to lead to real economic and social impacts. This ethos is particularly fitting in the drive to create a circular economy. If we want to resolve these challenges and build a more sustainable world, we need to connect the future leaders in engineering and complementary sectors, by building strong links between academia, business and government from all over the world. The Academy, through its *Frontiers of Engineering for Development symposia* and its *seed funding*, is proud to promote capacity building and pathways to impact for engineers who are tackling global challenges.

We hope that the symposium is enjoyable, exciting and productive, and we wish you every success.

Adisa Azapagic FEng

Professor of Sustainable Chemical Engineering, University of Manchester

David Greenfield

Managing Director of SOENECS Ltd. London Circular Economy Club (CEC)

Introduction to the Royal Academy of Engineering

As the UK's national academy for engineering, the Royal Academy of Engineering brings together the most successful and talented engineers from across the engineering sectors to advance and promote excellence in engineering.

The Academy is a delivery partner of the UK Government's *Global Challenges Research Fund* that supports cutting-edge research to address the challenges faced by developing countries. In this regard, the Academy has developed several programmes, including *Frontiers of Engineering for Development*.

Introduction to Frontiers of Engineering for Development

Frontiers of Engineering Symposia aim to bring together 60 of the best early- and mid-career researchers from industry, academia, NGOs and the public sector in multidisciplinary workshops that address fundamental development challenges.

The objectives of these symposia are to encourage collaborative work which addresses international development challenges and promotes cross-disciplinary thinking among the next generation of engineering leaders.

A competitively allocated Seed Fund is available to strengthen the collaborations developed at the symposium.

Structure of the symposium

The symposium will consist of three sessions over 2.5 days interspersed with networking opportunities, receptions and dinners.

Themes

- **Designing for Circularity**
- **Dematerialisation**
- **Learning from Natural Systems**

Networking opportunities

- Networking dinner
- Participant countdown
- Monday dinner
- Making connections
- Circular Economy Club Reception
- Engineering and Physical Sciences Research Council (EPSRC) panel and reception
- Linking up
- Writing proposals – Seed funding

All the networking sessions are described in more detail on page 9-10.

Funding opportunity

Participants are invited to apply for the Frontiers of Engineering for Development Seed Fund, where awards of between £10,000 and £30,000 are available to help kick-start a new interdisciplinary collaboration.

You will find more details via [the RAEng website](#), and in the guidance note, at the on page 29-35 of this pack. If you think you will apply for the funding it is worth forewarning the relevant authorities before the event, as the timeline for gaining institutional approval for your application will be very tight.

What to prepare

One-minute presentation (without slides)

On the first day, you are invited to present yourself and outline **what a circular economy means to you**. Please make sure you have prepared this before you arrive.

What to expect

The symposium aims to develop capacity, encourage challenge-led interdisciplinary research and create the right conditions for future funding bids. To make the most of the event, make sure you:

- Check out the participant list (Page 10-12) and their bios (in the annexes)
- We encourage you to leave your phone and emails behind during the day
- Participate fully, attending all sessions and activities

What to bring

Business cards

Please be sure to bring **lots** of your your business cards.

Documentation

Any material you might need about your research/innovation/technology during the symposium.

Personal belongings and dress code

Please bring your personal laptop, and adaptor (for UK [power sockets](#)). We hope for lovely weather, but sadly this can't be guaranteed. It will be the UK spring and it is very likely there will be some rain, so please bring appropriate wet weather gear. Please also bring sun cream and hats if you need them, as it may also be hot at times. Please do not forget your passport and visa if required. The dress code is business casual.

AGENDA

SUNDAY 29 April		
From 15.00	Participants arrive and check-in	Club Quarters Hotel
17.45	Meet in reception to walk to Admiralty Pub	Club Quarters Hotel
18.00	Registration, reception and ice breaker activity	The Admiralty Pub
19.00	Welcome Dinner	The Admiralty Pub
MONDAY 30 April		
08.30	<i>Meet in hotel lobby to walk to RAEng</i>	<i>Club Quarters Hotel</i>
09.00	Opening Address from Dr Hayaatun Sillem, CEO, Royal Academy of Engineering Welcome from Event Chairs	Prince Philip House
09.30	Participant countdown	Prince Philip House
11.00	<i>Tea and coffee break</i>	Prince Philip House
11.30	Session 1: Designing for circularity	Prince Philip House
13.30	<i>Lunch</i>	Prince Philip House
14.30	Session 2: Learning from natural systems	Prince Philip House
16.30	Group photo	Prince Philip House
16.35	<i>Tea and coffee break</i>	Prince Philip House
17.00	Free time	Prince Philip House
17.30	EPSRC Panel: engineering the Global Challenges: career pathways in international development	Prince Philip House
18.30	EPSRC/RAEng reception	Prince Philip House
TUESDAY 1 May		
08.30	<i>Meet in hotel lobby to walk to RAEng</i>	<i>Club Quarters Hotel</i>
09.00	Keynote: TBC	Prince Philip House
09.30	Session 3: Dematerialisation	Prince Philip House
11.30	<i>Tea and coffee break</i>	Prince Philip House
12.00	Frontiers insights	Prince Philip House
13.30	<i>Lunch</i>	Prince Philip House
14.30	Off-site activity: Thames boat trip	Westminster Pier
18.00	Circular Economy Club meet up	Barbican Conservatory

19.00	Reception and Dinner	Barbican Conservatory
WENDESDAY 2 May		
08.30	<i>Meet in hotel lobby to walk to RAEng</i>	<i>Club Quarters Hotel</i>
09.00	Keynote: Emma Fromberg, Ellen MacArthur Foundation	Prince Philip House
09.15	Ellen MacArthur Foundation Workshop	Prince Philip House
10.15	<i>Tea and coffee break</i>	Prince Philip House
10.30	Funding opportunities	Prince Philip House
11.15	Linking Up – planning proposals for seed funding	Prince Philip House
12.00	Pitching Session – Informal presentation of ideas/proposals to the group	Prince Philip House
12.30	Keynote: Carol Lemmens, Arup	Prince Philip House
13.00	Closing Comments from Event Chairs	Prince Philip House
13.30	<i>Working lunch – proposal planning</i>	Prince Philip House
14.30	Departure	Prince Philip House

SESSION DETAILS

Note: you can find further details on p. 24 to 28

Session 1: Designing for circularity

Session Co-Chairs: Catherine Joce, Cambridge Consultants and Kerry Kirwan, University of Warwick

*How do we embed design principles into practice? Alex Moreno, FiqueTex Colombia
Can designers really make a difference? Jamie O'Hare, University of Bath*

Session 2: Learning from natural systems

Session Chair: Richard MacCowan, Biomimicry UK

- 1. Trade-offs and nature. Richard MacCowan, Biomimicry UK,*
- 2. Biomimicry, Resilience and Sustainability. Julie Winnard, Haynard Ltd*
- 3. Agency! Dr Rupert Soar, Nottingham Trent University*
- 4. Human Centric Lighting. Giorgos Masourekkos*

Session 3: Dematerialisation

Session Chair: Raimund Bleischwitz, University College London

1. *Dematerialisation as a goal for circular economies.* Raimund Bleischwitz, UCL
2. *Remanufacturing.* David Fitzsimons, European Remanufacturing Council
3. *From Principles to Practices.* Devni Acharya, Arup

KEYNOTES

Tuesday 1 May, 9.00: TBC

Wednesday 2 May, 9.00: Emma Fromberg, Ellen MacArthur Foundation

Three elements in motion: what happens when we acknowledge that the circular economy is embedded? More and more designers, entrepreneurs and other makers are starting their journey to learn more about a circular economy; an economy that is restorative and regenerative by design. As more of these so-called 'circular' products are being put on the market, more questions reveal around what the effects are for society and the environment. What happens when a business model is being flipped from selling products to selling services? What kind of 'sharing' really happens on sharing initiative platforms? In this presentation, Emma will explore the role of product design in the transition to a circular economy.

Wednesday 2 May, 12.30: Carol Lemmens, Arup

Carol leads Arup's Global Advisory Services business and spearheads Arup's circular economy work. He was instrumental in developing Arup's position paper to define the circular economy in the context of the built environment. He also coordinates Arup's work as the Ellen MacArthur Foundation's (EMF) knowledge partner for the built environment. The partnership enables the Foundation and Arup to work together to develop circular economy principles across cities, transport, energy and water. Carol is also involved in research projects with EMF to scope a circular economy vision for India and China and in the recently initiated Circular Cities research project.

EVENING ACTIVITIES

Sunday 29 April: Welcome Reception/Dinner (The Admiralty Pub, WC2N 5DS)

Please join us at for a welcome drink and dinner. This is an informal opportunity to meet one another. If you would like to attend, please meet in the reception of the hotel at 5.45 **OR** meet us at the pub.

Monday 30 April: Co-hosted by RAEng and EPSRC. Engineering the Global Challenges: career pathways in international development Reception (Prince Philip House, SW1Y 5DG)

EPSRC and the Royal Academy of Engineering will co-host a panel discussion about career pathways in engineering for international development. Engineers at different career stages will discuss the opportunities and challenges in the sector, as well as their experiences and perspectives.

Chair: Andrew Lawrence, Head of Engineering, EPSRC

Panellists:

1. Marie Adeyemi, Chief Executive Officer and Founder, Dream Networks/University College London
2. Elliott Baxter, International Placement Coordinator, Engineers without Borders
3. Professor Jonathan Cooper FEng, Vice Principal Innovation and Knowledge Exchange, University of Glasgow
4. Dr Ana Mijic, Senior Lecturer, Imperial College London

Following the panel discussion, there will be a reception to celebrate engineering for the global grand challenges. This will be an opportunity to network with people at different career stages and sectors working across the world on international development challenges, drawn from EPSRC and Academy networks.

Tuesday 1 May: Circular Economy Club - London Chapter/RAEng Frontiers of Engineering for Development meet-up:

Keynote from Professor Ian Boyd FRSE, Chief Scientific Adviser to the Department for Environment, Food and Rural Affairs (Barbican Conservatory, Silk St, London EC2Y 8DS)

The Royal Academy of Engineering and Circular Economy Club will co-host a networking reception and dinner as part of the wider symposium. This will be an opportunity for symposium participants to meet with the London Circular Economy Club members, an international network that exists to connect circular economy professionals and spur collaboration around the circular economy to accelerate the practicalities of embedding circularity. The keynote will take place at 6.45pm and dinner will be served from 7.30pm.

NETWORKING ACTIVITIES

Participant countdown

Participant countdown is the first networking activity, and provides a chance for all participants to introduce themselves, their work, and are invited to outline what a circular economy means to them. Participants will be divided into four groups of 15 people. During the first 15 minutes, each member of group A will have one minute to introduce themselves to the rest of the symposium attendees. Then, after all 15 group A participants have spoken, there are 15 minutes when people are free to approach those who have just spoken to ask further questions. Rounds of 15 minutes of presentations and 15 minutes of discussions will follow for groups B, C and D until all the participants have introduced themselves.

Frontiers Insights

This session is designed to capture key messages and discussions from the event. The messages will contribute to a short report that will be shared online and in print after the event. Six flip charts will be positioned around the room, each with a key question/challenge drawn from one of the themed sessions that took place over the first two days of the event. A session or event chair will lead a discussion around each question or challenge, taking notes on the flip chart. We encourage an open and collaborative debate, where all points of view are respected and listened to. Please note that this session will operate under Chatham House Rule to encourage a free and honest discussion. Based

on the discussion, each group will work together to craft two or three sentences in answer to the question/challenge. Each flip chart group has one minute to feed back their discussion to the room, and two minutes for questions/comments. This will give a chance to gather further input and/or additions to each insight.

Linking up

The 'linking up' session aims to provide you with the building blocks for interdisciplinary collaboration. During this session, you will work with the participant(s) you would like to start an interdisciplinary collaboration with, and potentially apply for the Seed Fund, to complete the *Linking up* sheet. This will help you to clarify your ideas, aims and start building a plan. In this session, each collaboration will be given the opportunity to pitch their ideas to the rest of the room for feedback and/or for other people working on a similar project to join forces. We impose a strict 2-minute time limit!

You will find the *Linking up* sheet in your welcome pack or via www.raeng.org.uk/FoE

FULL ATTENDANCE LIST

Name	Organisation
Abdullahi Ahmed	Coventry University
Adisa Azapagic	The University of Manchester
Adit Shah	Space Platform Technologies
Alex Makalliwa	Kuza Automotive
Alex Moreno	Fiquetex S.A.S
Anant Raheja	FIB-SOL Life Technologies Pvt. Ltd.
Andre Nel	EcoV/Blue-Green tower
Anna Bogush	University College London
Anna Lowe	MakerNet Alliance
Bernard Naude	Aegis Environmental
Bernardo Gonzalez	Fomento Mexicano
Burcu Karaca Uğural	Ege University
Carol Lemmens	Arup
Catherine Joce	Cambridge Consultants
Dani Barrington	University of Leeds
David Fitzsimons	European Remanufacturing Council
David Greenfield	Soenecs/Circular Economy Club

Dechao Kong	National Grid
Devni Acharya	Arup
Gillian Menzies	Heriot Watt University
Mariale Moreno	Cranfield University
Raman Maiti	University of Sheffield
Elliott Baxter	Engineers Without Borders
Emma Fromberg	Ellen MacArthur Foundation
Evdoxia Viza	University of the West of Scotland
Francesco Pomponi	Edinburgh Napier University
Gamelihle 'Gama' Sibanda	Biomimicry South Africa
Geraldine Ann Cusack	Siemens Ltd / Royal Irish Academy
Giorgos Masourekkos	Independent
Irnia Nurika	University of Brawijaya
Jamal Hassan	ShambaIntel Africa Limited
Jamie O'Hare	University of Bath
Jim Hart	Edinburgh Napier University
Julie Winnard	Haynard Ltd
Kahit Hein	FasoPro
Kai Yang	University of Southampton
Kerry Kirwan	University of Warwick
Lara Ayris	Waste Plan Solutions
Leticia Cabral	Consultant
Levit Barry Nudi	NotonLab
Libu Manjakkal	University of Glasgow
Lowell Martin Scarr	Nambu
Lungie Zondi	SLE Farming
Max Affre	Sistema.bio
Meryl Wingfield	BP
Paul Begley	Cambridge Institute for Sustainability Leadership

Raimund Bleischwitz	University College London
Ravinder Dahiya	University of Glasgow
Richard MacCowan	Biomimcry UK Innovation Lab
Rupert Soar	Nottingham Trent University
Shyeni Paul	EPSRC, UKRI
Siddharth Hande	Kabadiwalla Connect
Simone Cooper-Searle	Chatham House
Sylvia Roberge	Engineers Without Borders UK
Werner Swart	Drylobag International
Žaneta Muranko	London South Bank University
Zeinab ElMaadawi	Cairo University
Zhihua Xie	Cardiff University

Annexes:

13-23	Chair and Participant bios
24-28	Session briefs
29-35	Seed funding guidance note
36	Code of Conduct
37-38	Social media toolkit
39	Important contact information

PARTICIPANT LIST AND BIOS

Event Chairs

Dr David Greenfield, Managing Director SOENECS



Dr David Greenfield is the Managing Director of SOENECS Ltd (SOcial, ENvironmental & EConomic Solutions), an independent environmental research and advisory practice that he set up in 2014 following 15 years in leadership roles in local and regional government. Dr Greenfield provides strategic advice and support to the public and private sectors and specialises in the fields of circular economy, waste management, resource management, climate change, renewable deployment, carbon management and partnership delivery.

He is a Chartered Waste Manager, a Fellow of the Chartered Institution of Wastes Management (CIWM), a Fellow of the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA) and a Chartered Environmentalist.

Dr Greenfield co-created and is managing the Department for Transport (DfT) funded research project 'Pothole Spotter'. He is also: a Non-Executive Director of Chartered Institute of Wastes Management Enterprises; Trustee and Director of Freegle; Co-founder of the Circular Economy Dinner Club; Non-Executive Chair of the board of directors for ADBA; Chair of the Institution of Civil Engineers Resource Management Panel; Delivery Director for the Diocese of Chichester Energy Stewardship Programme; and advisor and past Chair to the National Waste Network Chairs

Adisa Azapagic, University of Manchester



Adisa Azapagic FEng is Professor of Sustainable Chemical Engineering at the University of Manchester. She leads Sustainable Industrial Systems, a multidisciplinary research group working in close collaboration with industry, policymakers and other stakeholders to help identify and implement sustainable solutions to current sustainability challenges (www.sustainable-systems.org.uk).

Professor Azapagic is the founding Editor-in-Chief of *Sustainable Production and Consumption* and Editor-in-Chief of *Process Safety and Environmental Protection*. She has received several awards for her research, including the Institution of Chemical Engineers Award for Outstanding Achievement in Chemical and Process Engineering, and GSK Innovation Award for masterminding the carbon footprinting tool CCaLC (www.ccalc.uk.org). She recently chaired the Academy's study on *Sustainability of Liquid Biofuels*, funded by the Department for Business, Energy and Industrial Strategy and DfT.

Participant Bios

Abdullahi Ahmed, Coventry University

Dr Abdullahi Ahmed is a Senior Lecturer in Building Services and Sustainable Design at Coventry University. He has academic and industry experience in the field of building physics, sustainable design and building integrated renewable energy. Dr Ahmed has applied his research in a development context.



Adisa Azapagic, University of Manchester

Adisa Azapagic FEng is Professor of Sustainable Chemical Engineering at the University of Manchester. She leads Sustainable Industrial Systems, a multidisciplinary research group working in close collaboration with industry, policy makers and other stakeholders to help identify and implement sustainable solutions to current sustainability challenges.



Adit Shah, Space Platform Technologies @aeroengineer

Adit is an aerospace engineer and has worked in the aerospace and railway infrastructure industries as an engineer, and as a researcher in off-shore wind turbine design. He now works developing technologies for sustainable space, and also as a consultant for companies in mechanical / aerospace engineering domains.



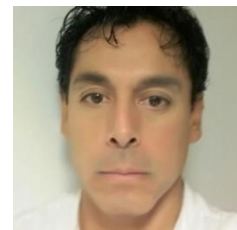
Alex Makalliwa, Kuza Automotive

Engineering affords one the ability to appreciate the world as it is, while also reaching out towards a vision of the world as it could be. It is upon this premise that Alex, who splits his time between the UK and Kenya, finds inspiration to be involved in building technology that promotes social change.



Alex Moreno, Fiquetex S.A.S

Alex is passionate about innovation. With five patents in different areas, he has a vast experience in the fields of non-woven textiles, natural rubber latex, industrial inks and electrostatic coating among others. He likes challenges and is very open to sharing knowledge. He is very concerned with the environmental problems of the 21st century.



Anant Raheja, FIB-SOL Life Technologies Pvt. Ltd.

Technology Entrepreneur with interest in designing advanced materials for environmental and industrial applications. Anant has research expertise in polymeric nanofibers and holds a PhD from the IIT Madras. He leads the technology development at FIB-SOL for creating ultra-light weight nanofiber formulations for Agriculture.



André Nel, Eco-V

André Nel has a Masters degree in Engineering from the University of Pretoria, South Africa and is Technical Director at Eco-V. He is the inventor of GreenTower technology and recipient of several awards. GreenTower Microgrids affordably provide electricity, fresh water, hot water and sanitation from renewable resources for self-sustainable communities.



Anna Bogush, UCL

Anna is a Research Associate (PhD, MSc, BSc) at UCL with research and teaching experience within interdisciplinary areas. She has been working on urban mining, sustainable processing, waste management, material characterisation, and metal speciation in a variety of industrial wastes on projects funded by EPSRC/NSFC, COST, UCL, industry, and the Environment Agency.



Anna Lowe, MakerNet Alliance @annawillcreate

Previously a supply chain consultant, Anna realised the advantages of manufacturing things close to where they are needed and started to work on local manufacturing in developing countries. She is a co-founder of Kumasi Hive makerspace in Ghana & the MakerNet Alliance of individuals and organisations working on sustainable local manufacturing.



Bernard Naude, Aegis Environmental

Bernard Naude is the founder and CEO of Aegis Environmental. He founded the company in 2015 in South Africa with the vision of solving the global food waste and production problem with an integrated solution. The company has succeeded in building a pilot plant and recycling food waste.



Bernardo Gonzalez, Fomento Mexicano Para El Desarrollo Sustentable

Bernardo González is an adviser in fresh water projects for NGO Fomento Mexicano para el Desarrollo Sustentable. He was involved with the MAPwater project, funded by the Royal Academy of Engineering and led by the University of Bath in 2017, that focused on availability of water in a rural community in Mexico.



Burcu Karaca Uğural, Ege University

Burcu Karaca Uğural graduated from Ege University, Turkey with MSc & PhD degrees in Textile Engineering. She is working as research assistant at Ege University, Department of Textile Engineering and co-founder of the start-up company "B-PREG" providing sustainable solutions in vehicle light-weighting by designing & developing natural fiber reinforced thermoplastic prepregs.



Carol Lemmens, Arup

Carol leads Arup’s global Advisory Services business and was instrumental in developing Arup’s position paper to define the circular economy in the context of the built environment. He also coordinates Arup’s work as the Ellen MacArthur Foundation’s (EMF) knowledge partner for the built environment.



Catherine Joce, Cambridge Consultants

Catherine is a Consultant in Strategy, Process and Innovation. Her career has focused on supporting companies to innovate new circular economy products and services, such as remanufacturing, recycling and product service systems. Previously, Catherine launched and led a programme of innovation support for the circular economy at the Knowledge Transfer Network. Catherine is a Chartered Environmentalist.



Dani Barrington, University of Leeds, @dani_barrington

Dani works on water, sanitation and hygiene (WaSH) in low resource contexts. She is passionate about using participatory research methods to work at the nexus of technology and society, particularly investigating how appropriate WaSH technologies, programmes and policy can improve health and well-being outcomes.



David Greenfield, SOENECS @DrResources

David is the Managing Director of SOENECS Ltd, an independent environmental research and advisory practice that he set up in 2014. David provides strategic advice and support to the public and private sectors and specialises in the fields of circular economy, waste management, resource management, climate change, renewable deployment, carbon management and partnership delivery.



David Fitzsimons, European Remanufacturing Council, @RemanCouncil and @OakdeneHollins

The European Remanufacturing Council represents companies such as IBM, Lexmark, Volvo, SKF, Michelin, Autocraft, PSS, Hetzel and others who take back products and components for remanufacture, returning them to use as new (or better).



Dechao Kong, National Grid

Dechao has over 10-years work experience in the Power & Energy industry, involving in comprehensive engagement with stakeholders in China and UK to introduce innovative smart grid and low-carbon technologies within modern Power & Energy systems. He is an active member in some well-recognised IET and CIGRE events.



Devni Acharya, Arup

Devni is a senior consultant at Arup driving the circular economy and sustainable resource and waste management agenda through international projects and research. She draws on her understanding of materials, waste, energy, carbon and urban planning to develop integrated solutions for clients. Current research areas focus on translating circular economy principles into built environment practice.



Elliott Baxter, Engineers Without Borders

Elliott is a mechanical design engineer with experience designing products in a wide range of contexts, from med-tech startups to international development. Through Engineers Without Borders UK, Elliott spent a year in India designing improved cookstoves for scale manufacture, and now remains with the organisation as an international placement coordinator.



Emma Fromberg, Ellen MacArthur Foundation

Emma is a designer by background and is part of the Education Team of the Ellen MacArthur Foundation. At the Foundation, she leads informal learning, in which the annual Disruptive Innovation Festival plays a significant role. Besides informal learning, she works within the Circular Design Team on smart material choices and material health.



Evdoxia Viza, University of the West of Scotland @evi1603

Evi is a Mechanical and Manufacturing Engineer, a Chartered Quality Professional and an EFQM assessor. She has worked in four different countries and in research organisations, industry, and the public sector. She has recently joined academia. Her research areas are in engineering education, gender balance in STEM and circular economy.



Francesco Pomponi, Edinburgh Napier University @fpomponi

Francesco is an academic and engineer with 10 years+ experience in the construction industry. He currently holds the Vice Chancellor's Fellowship at Edinburgh Napier University. His interdisciplinary research focuses on circular economy, life cycle assessment, and the measurement, management and mitigation of the environmental impacts of the built environment.



Gamelihle 'Gama' Sibanda, Biomimicry South Africa

Gamelihle fuses his skills in civil engineering, business and biomimicry towards creation of a regenerative planet; where there is enough for all forever. A visual story teller and rapid ideator, he uses his diverse skills to innovate and teach nature inspired solutions to human challenges.



Geraldine Ann Cusack, Siemens, Royal Irish Academy

Geraldine A. Cusack is a chartered engineer and chartered water and environmental manager whose technical project work covers hydro-geo-environmental consulting. Geraldine works in Siemens Digital Factories (Ireland) helping to drive and implement sustainable solutions for industry through the mechanisms of Electrification, Automation and Digitalisation.



Gillian Menzies, Heriot Watt University @carbonacademics

Gillian is Associate Professor of Environment and Climate Change at Heriot Watt University, with a research record in Life Cycle Assessment (LCA), and is Director the Institute for Sustainable Building Design. Gillian has a background in energy and architectural engineering and an ongoing passion for the circular economy and social & environmental LCA.



Giorgos Masourekos (Independent)

Giorgos is an electrical engineer graduate of Newcastle University with a master's degree in renewable energy currently working in the building services sector. Working on high-end projects worldwide has provided him with a profound understanding of engineering. Special interests include biomimicry, smart cities, circular economy and building management systems.



Irnia Nurika, University of Brawijaya

Irnia Nurika is an associate professor at Agroindustrial Technology, Universitas Brawijaya, Indonesia. She received her PhD in Plant and Environmental Sciences from School of Life Sciences University of Warwick UK. Her principal research interests are in agricultural waste management, in particular the development of lignocellulosic biorefinery utilising protein engineering.



Jamie O'Hare, University of Bath @ecodesignjamie

Jamie has 13 years of experience in the field of design for sustainability and the Circular Economy. He was the lead author of the UN Environment 'Eco-innovation Manual', which helps practitioners in developing economies to integrate sustainability considerations into the business strategy, business model and product design activities of manufacturers.



Jamal Mohamed, ShambaIntel @Hmohamedjamal

Jamal Mohamed is the Co-founder and Team Lead of ShambaIntel Africa Limited, a Kenyan agricultural technology startup company that deals with market renowned technologies that aim at improving agriculture. His passion for innovation and technology has led him to achieve significant contributions to social changing ideas.



Jim Hart, Edinburgh Napier University

Jim Hart has been a sustainability professional for nearly 20 years, working on projects concerning waste and resources, buildings, energy, etc. He is now studying for a PhD on circular economy and construction at Edinburgh Napier University, and continues to provide support to low-carbon entrepreneurs through the Climate-KIC programme.



Julie Winnard, Haynard Ltd

Julie is a freelance sustainability consultant with a background in engineering design and innovation, project management and transport, especially automotive. She has published research on how to find sustainable, resilient strategies for technology or business decisions, she is interested in how memes influence people's actions; loves nature and supports Transition Engineering.



Kahitou Hien, FasoPro

Kahit, from Burkina Faso started FasoPro while studying engineering in 2011. He won U.C. Berkeley's Global Social Venture Competition for best social start-up in 2012. In 2016, he launched a new product: dried caterpillars. He is still a researcher at heart and his team continues to work on better ways to breed the caterpillars in a controlled environment.



Kai Yang, University of Southampton

Kai Yang obtained her PhD in 2009 from the University of Leeds on the subject of ink formulation for textile digital printing. She is a Principal Research Fellow at the University of Southampton. Her research interests include ink formulation, smart textiles, printed electronics, and wearable technologies for healthcare applications.



Kerry Kirwan, University of Warwick

Kerry is a Professor of Sustainable Materials and Manufacturing at WMG and Academic Director (Research) for the University of Warwick. He leads the EPSRC CDT in Sustainable Materials and Manufacturing and the Industrial Doctorate Centre in High Value Manufacturing. He also leads the University's Global Research Priority in Innovative Manufacturing.



Lara Ayris, Waste Plan Solutions @WastePlan

Lara founded WPS in 2009 as a part time venture, being a new Mum. Amazingly, a few short years later both her and the company have won several prestigious awards and they boast a client list to be proud of, as their reputations grow as specialist compliance consultants.



Leticia Cabral, Consultant/Advisor

Leticia is an international consultant focused on the development and implementation of business models and strategies. Over the last years, she has focused her career primarily on advising and mentoring social entrepreneurs from Latin America, Asia and Europe. She also participates as mentor and judge in several global innovation and social entrepreneurship competitions.

Levit Barry Nudi NotonLab @levitnudi

Levit is a research scientist and a software developer who is passionate about using innovative technologies to improve the quality of lives of all people in Africa.



Libu Manjakkal, University of Glasgow

Libu Manjakkal is research associate in the School of Engineering at University of Glasgow. He is member of Bendable Electronics and Sensing Technologies (BEST) Group. His research interests are in the field of printable sensors and electronics, electrochemical sensing and energy storage.



Lowell Martin Scarr, Nambu

Lowell is completing his PhD in Economics at Rhodes University while concurrently establishing Nambu, an insect rearing company that turns food waste into high value protein and oil for use in animal feed. He has a background in agriculture and environment and is looking to develop opportunities in these areas.



Lungie Zondi, SLE Farming

Lungie has completed studies in law and the social sciences in Cape Town. She is currently involved in social entrepreneurship and poverty alleviation through agricultural initiatives in rural areas in South Africa in close partnership with the South African government and members of the private sector.



Mariale Moreno, Cranfield University @mariale_moreno

Dr Mariale Moreno is a Lecturer in Data-Driven Innovation. With a PhD in Sustainable Consumption and Design, Mariale has specialised in using and refining a mix methods approach to interpret and analyse consumer data from digital and ethnographic sources to enable innovation. By taking this collaborative approach, Mariale is able to analyse different data streams to identify different user/company patterns, behaviours and preferences relevant to create opportunities.



Max Affre, Sistema.bio

Industrial engineer with a Msc. in Water and wastewater treatment Engineering from Cranfield University, Maxence is technical operation manager at Sistema.Biobolsa, a social and environmental company focusing on biodigester systems. Before, Maxence worked for Veolia and Suez, as commissioning and project engineer, in Latin America, Asia, Europe and the Middle East.



Meryl Wingfield, BP @merylwingfield

Meryl is the Market Development Director in BP's Advanced Mobility Unit, which develops new businesses in future mobility modes, including electric vehicle charging. She is a transformation leader and most recently spent seven years in R&D. Meryl is a trustee of Surrey Wildlife Trust and volunteers at Farnham Repair Café.



Paul Begley, The University of Cambridge Institute for Sustainability Leadership

Paul is the Director for Customised Programmes. He runs a portfolio of strategic educational initiatives to help organisations in the areas of climate change, leadership and the circular economy. Recently, Paul has designed courses for decision-makers at Interface, Tata Group and the World Bank.



Raimund Bleischwitz, University College London @BleischwitzR

Raimund is Chair in Sustainable Global Resources and Deputy Director at the UCL Institute for Sustainable Resources. He is currently PI of an international collaborative project on the circular economy in China (SINCERE), and participates in several EU projects on eco-innovation and raw minerals. His recent book is the Routledge Handbook of the Resource Nexus.



Raman Maiti, University of Sheffield

Biomedical Engineer using computational and experimental techniques to understand problems related to Orthopedics, Ophthalmology and Dermatology. Other hobbies are acting, running, playing badminton and squash, watching movies and travelling.



Ravinder Dahiya, University of Glasgow, @RavinderSDahiya

Ravinder is Professor of Electronics and Nanoengineering. He leads the Bendable Electronics and Sensing Technologies (BEST) group and his research interests are in the field of flexible and printable electronics, disposable electronic systems, and wearable electronics with focus on health applications. He has 11 patents (inc. seven submitted) and has written four books.



Richard MacCowan, Biomimicry UK @Biomimicry_UK

Richard is the Founder & Managing Director of Biomimicry UK | Innovation Lab. His background is in real estate finance and development and urban design, but he now works in diverse fields from packaging, architecture, materials and computing with some of the world's leading companies



Ruper Soar, Freeform Construction Ltd

Rupert is reader in Construction Technologies at Nottingham Trent University, & Consultant through Freeform Construction and Engineering Ltd. Rupert works between field research with termites and application in 'digital construction' technologies. His special interest is how organisms integrate multiple functions within the same solution, because this could solve our own 'resource scarcity' challenges.



Shyeni Paul, EPSRC, UKRI

Shyeni is a portfolio manager in the Manufacturing theme at EPSRC. She is responsible for the Circular Economy portfolio. EPSRC is the main funding body for engineering and physical sciences research in the UK. EPSRC is part of UK Research and Innovation, a non-departmental public body funded by a grant-in-aid from the UK government.



Siddharth Hande, Kabadiwalla Connect @kabadiconnect

Siddharth is a spatial data analyst by training. At Kabadiwalla Connect, his work focuses on developing scalable and inclusive solutions to the collection, aggregation and processing of post-consumer waste in cities in the developing world. He hopes to be able to articulate a cheaper and more inclusive approach for cities in the Global South to apply circular economy principles — by leveraging the informal waste ecosystem.



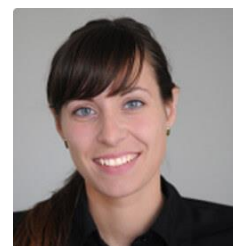
Simone Cooper-Searle, Chatham House @SimoneUK

Simone has multidisciplinary expertise in material efficiency, circular economy and climate change policy and sector expertise in mining, steel, automotive and construction. She has ten years of experience conducting research for industry, academia, governments and NGO community. She holds a PhD from Cambridge University and currently works at Chatham House.



Sylvia Roberge, Engineers Without Borders

International Projects Manager at Engineers Without Borders UK. Since she joined the organisation in 2013, Sylvia has supported the delivery of their educational programmes and, in her current role, manages the coordination and implementation of their overseas engineering volunteer programmes. She is based in London, UK.



Werner Swart, Drylobag International

Based in South Africa, Werner is the founder and CEO of Drylobag International. He invented and developed a unique system to dry and store grain in a flexible, non-permanent structure (basically a 50-meter plastic bag) for up to two years. This system addresses the problem of post-harvest losses.



**Žaneta Muranko, London South Bank University
@ZanetaMuranko**

Žaneta is a Product Design Engineer with interests in sustainable manufacture, behavioural science and development of a Circular Economy. She is currently completing industry-founded PhD research on the Circular Economy and its potential development in the Retail Refrigeration Industry.



Zeinab Mohamed E IMoghazy El Maadawi, Cairo University

Zeinab ElMaadawi (MD) is a professor & e-learning manager at the faculty of medicine, Cairo university where she works as medical educator, biomedical researcher & e-learning expert with experience in international education management. She is passionate about using the added value of emerging technologies to promote access to quality education & learning for all.



Zhihua Xie, Cardiff University @ZhihuaXie

Zhihua is a lecturer in the School of Engineering at Cardiff University. He obtained Ph.D. from University of Leeds, and worked as research associate at Cardiff University and Imperial College London. His research interests include computational fluid dynamics, turbulence modelling, multiphase flows, wave mechanics, hydrodynamics, hydraulics, and environmental fluid mechanics.



RAEng Staff

Alice Marks, GCRF
Programme Officer



Lucy Webb, Events
Assistant



Russell Lamb, GCRF
Programme Officer



Samantha Frost, Senior
Manager, International
Strategy and
Partnerships



SESSION 1: DESIGNING FOR CIRCULARITY

30 APRIL, 11.30AM

Session Chairs

Opening Presentation: *Reclaimed materials in high performance applications - WorldF3rst racing car technologies.* Kerry Kirwan, University of Warwick

Kerry is a Professor of Sustainable Materials and Manufacturing at WMG and Academic Director (Research) for the University of Warwick. He leads the EPSRC CDT in Sustainable Materials and Manufacturing and the Industrial Doctorate Centre in High Value Manufacturing. He also leads the University's Global Research Priority in Innovative Manufacturing.



Introduction: *Business As Unusual.* Catherine Joyce, Cambridge Consultants

Catherine will give examples of using technology and engineering to enable businesses to take advantage of the circular economy.

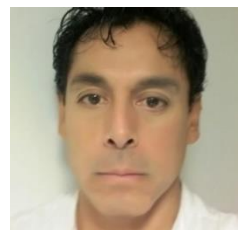


Catherine is a Consultant in Strategy, Process and Innovation with Cambridge Consultants. Her career has focused on supporting companies to innovate new circular economy products and services, such as remanufacturing, recycling and product service systems. Prior to joining Cambridge Consultants, Catherine launched and led a programme of innovation support for circular economy at the Knowledge Transfer Network. Catherine is a Chartered Environmentalist.

Talks and Speakers

Reality: How do we embed design principles into practice? Alex Moreno, Fiquetex S.A.S

Alex is passionate about innovation. With five patents in different areas, he has a vast experience in the fields of non-woven textiles, natural rubber latex, industrial inks and electrostatic coating among others. He likes challenges and is very open to sharing knowledge. He is very concerned with the environmental problems of the 21st century



Can designers really make a difference? Jamie O'Hare, University of Bath @ecodesignjamie

Jamie has 13 years of experience in the field of design for sustainability and the Circular Economy. He was the lead author of the UN Environment 'Eco-innovation Manual', which helps practitioners in developing economies to integrate sustainability considerations into the business strategy, business model and product design activities of manufacturers.

SESSION 2: LEARNING FROM NATURAL SYSTEMS 30 APRIL 14.30PM

This session will seek to explore how nature solves problems - sometimes in ways that are totally contradictory to what we expect. The symposium is invited to open their eyes to structure, space and time – the key ways that nature solves problems. There are many new and exciting things to discover.

Session Chair

Talk 1: Trade-offs and nature. Richard MacCowan, Biomimicry UK, @Biomimicry_UK

There is no such thing as perfection, and nature is full of trade-offs – yet the system still works. Richard will invite the symposium to explore the complex science around the how and why functions occur and make systems work.

Richard is the Founder & Managing Director of Biomimicry UK | Innovation Lab. His background is in real estate finance and development, and urban design, but he now works in diverse fields from packaging, architecture, materials and computing with some of the world's leading companies.



Speakers

Talk 2: Biomimicry, Resilience and Sustainability. Julie Winnard, Haynard Ltd

Some of the tricks we use to analyse systems are useful but they let us forget about real-life complexity and how nature actually works. This presentation is a whistle-stop tour of some key points around this and how we need to think differently to design sustainable systems which are resilient

Julie is a freelance sustainability consultant with a background in engineering design and innovation, project management and transport, especially automotive. She has published research on how to find sustainable, resilient strategies for technology or business decisions, she is interested in how memes influence people's actions; loves nature and supports Transition Engineering.



Talk 3: Agency! Dr Rupert Soar, Nottingham Trent University

Nature works at the process level – it doesn't recognise form or function. By applying this simple rule, nature is able to produce amazingly complex systems. Rupert's talk will look at agent systems based on super organisms. We are all part of a system, and part of the solutions, so we need to work together to develop new and better strategies.



Rupert is reader in Construction Technologies at Nottingham Trent University, & Consultant through Freeform Construction and Engineering Ltd. Rupert works between field research with termites and application in 'digital construction' technologies. His special interest is how organisms integrate multiple functions within the same solution,

because this could solve our own 'resource scarcity' challenges. He is also the Director of the Termites Trust (Namibia).

Talk 4: Human Centric Lighting. Giorgos Masourekkos

Human centric lighting is a concept that focuses on artificial light mimicking natural light by adjusting the colour temperature of the lights from warm too cold to match the colour temperature variations of the natural light. This is extremely important as people have evolved in a way that these variations are at the heart of our internal clock that is more commonly referred to as circadian rhythm. As the majority of people spend a big percentage of their everyday life indoor providing conditions that are in line with our circadian rhythm have a huge impact on people's behaviour. Human centric lighting could potentially have a huge impact in sectors like education and business where research is pointing towards better results and increased productivity.



Giorgos is an electrical engineer graduate of Newcastle University with a master's degree in renewable energy currently working in the building services sector. Working on high-end projects worldwide has provided him with a profound understanding of engineering. Special interests include biomimicry, smart cities, circular economy and building management systems.

SESSION 3: DEMATERIALISATION

1 MAY, 9.30AM

Many people engage with the circular economy as guiding principles for design, business activities, and urban sustainability. The long-term aspirations, however, are often less clear. This session comes with the provocation of a dematerialisation – societies using less primary resources while enhancing values. Would such goals be feasible? Would it be desirable and in line with the UN Sustainable Development Goals (SDGs)? These issues form the wider setting for a fresh discussion about a circular economy. We look forward to engaging with you and your thoughts! Raimund will give an introduction to set the scene. Devni will kick-off a debate about a renewed built environment in the 21st century. David will share experience with RE-manufacturing here and in China – all meant to stimulate ideas from different angles and to move on towards a circular economy.

Session Chair

Talk 1: Dematerialisation as a goal for circular economies.

Raimund Bleischwitz, University College London @BleischwitzR

This presentation will introduce a rationale for dematerialisation related to planetary boundaries and the UN SDGs. It will discuss pillars to achieve it and the role for a circular economy. It is, however, clear that pluralist and innovative strategies are needed, driven by entrepreneurial citizens and states. The last section will propose some strategic avenues for further action.



Raimund Bleischwitz is Chair in Sustainable Global Resources at University College London (UCL), and Deputy Director at the UCL Institute for Sustainable Resources (UCL ISR). He is currently Principal Investigator of an international collaborative project on the circular economy in China (SINCERE), and participates in a number of EU projects on eco-innovation and raw minerals (Green.EU/Inno4SD, RECREATE, POLFREE, Minatura, Mica). His recent book is the Routledge Handbook of the Resource Nexus.

Speakers

Talk 2: Remanufacturing. David Fitzsimons, European Remanufacturing Council, @RemanCouncil and @OakdeneHollins

Remanufacturing is an industrial process for used products and components, returning them to use in as new (or better) condition. The process is sometimes described as reconditioning or refurbishing, in Japan it is described as inverse manufacturing. In a European study published in 2016, aggregate sales in EU28 were estimated to be €30 billion with potential to grow significantly. The aviation and automotive sectors represent the largest sectors of activity with IT equipment, marine, defence, rail and machine tool sectors representing others. As a product life extension technique, it could be applied to a far wider range of products as it is currently largely confined to B2B transactions although with a few notable B2C exceptions. The resource efficiency savings vary between product categories but are typically large in



comparison with the new equivalent. Having just returned from China, David will describe the new national demonstration base for remanufacturing in Hebei Province.

The European Remanufacturing Council represents companies such as IBM, Lexmark, Volvo, SKF, Michelin, Autocraft, PSS, Hetzel and others who take back products and components for remanufacture, returning them to use as new (or better).

Talk 3: From Principles to Practices. Devni Acharya, Arup

Devni will present the interim findings from an Ellen MacArthur Foundation/Arup initial exploration of circular economy principles as applied to built environment practices. She will explore three major questions:

- Where are we now?
- Where are we going?
- What do stakeholders need to do to help us get there?



Devni is a senior consultant at Arup driving the circular economy and sustainable resource and waste management agenda through international projects and research. She draws on her understanding of materials, waste, energy, carbon and urban planning to develop integrated solutions for clients. Current research areas focus on translating circular economy principles into built environment practice.

Applicant guidance notes – Frontiers of Engineering for Development seed funding Tranche 5

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1. Applicant and Institution details
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5. Declaration
Assessment of applications

Key information:

Award Value: £10,000 to £30,000
Applications open: 30 April 2018
Applications close: 16 May 2018, 12.00 (mid-day) UTC+1.
Project dates: 29 June 2018 – 28 June 2019 (1 year duration)

Introduction

There is growing recognition that there is a need for interdisciplinary, challenge-based research at the frontiers of traditional disciplines to achieve real economic and social impacts and help meet global challenges. The “Frontiers of Engineering for Development – Seed funding” aims to address this need by funding collaborative interdisciplinary pilot research projects.

Frontiers of Engineering for Development – Seed funding, is competitively allocated funding. We anticipate a 50% success rate for applications. This funding is available to the participants of the Frontiers of Engineering for Development symposium. It aims to facilitate national or international interdisciplinary collaborations between attendees of the symposium, and supports pilot research that addresses global challenges.

All awards under this call must begin on the **29 June 2018** and end on or before **28 June 2019**.

The research project must be interdisciplinary, pilot-stage and challenge-based research. The funding could support, but is not limited to:

- Gaining preliminary data for a new project between two or more participants of a Frontiers of Engineering for Development symposium

- Developing a further consortium or workshop between two or more Frontiers of Engineering for Development symposium participants, plus additional participants who did not attend the event
- Acquiring data by supporting graduate students to work within the research groups of two or more participants.

GCRF Objectives

Frontiers of Engineering for Development – Seed funding is awarded under the Global Challenges Research Fund, a part of the UK government’s Official Development Assistance (ODA). As such, collaborations supported by this programme must meet ODA requirements, and must:

- aim to promote the welfare and economic development of a country or countries on the DAC list of ODA recipients: <http://bit.ly/DACLIST>
- be designed to address a development need
- focus on a specific challenge affecting a developing country or region.

For further guidance on ODA compliance, please follow: <http://bit.ly/ODAreq>

Eligibility criteria

- This funding is to promote a new collaboration between Frontiers of Engineering for Development symposium participants. The activities can involve non-conference participants, but **at least two primary applicants must have attended Frontiers of Engineering for Development in April/May 2018.**
- The project must comply with the ODA requirements: <http://bit.ly/ODAreq>
- The project must be interdisciplinary
- Pre-existing collaborations are NOT eligible
- **Lead Applicant Person Specification**
 - **The lead applicant must be hosted by a UK university.** They may have attended the Frontiers of Engineering for Development symposium in April/May 2018 **OR** a previous Frontiers of Engineering for Development symposium **OR** be a previous or existing recipient of EPSRC funding. Follow link for info: <http://bit.ly/EPSRCVoP>
Note: please be aware that due to time restrictions, RAEng staff will not be able to help you find lead awardees beyond providing you with the relevant lists and databases.
 - They must be employed by a UK university
 - They should be at an early or mid-career stage, usually 0-20 years post-doc. In most cases, they will not yet have reached Professorship. Consideration will be given to those who have taken a non-standard career path or career break.
 - More established researchers can be involved in the project but will often take an advisory position. Therefore, we expect the lead applicant to be the researcher who will undertake a majority of the project work.

Please contact Alice Marks if you have any questions regarding your eligibility: Alice.Marks@RAEng.org.uk

Submission deadline

The deadline for applications is **12.00 pm (mid-day) UTC+1 on Wednesday 16 May 2018.** Any incomplete or late applications will not be considered.

Diversity

The Academy values diversity and the different perspectives people from different backgrounds bring to their work and to the engineering profession. It is the Academy's policy to ensure that no grant applicant or recipient is disadvantaged or receives less favourable treatment because of age, disability, gender, pregnancy and maternity, ethnicity, religion or belief, sexual orientation or marriage and civil partnership status.¹

Monitoring

Awardees are expected to submit progress reports. All monitoring, including the submission of documents and reports, is completed through the Academy's online grant management system.

- *Report:* End of project reports must be submitted jointly by the researchers at the end of the award
- *Follow up report:* To enable the Academy to assess the long-term effectiveness of our schemes we also require a brief follow-up report 12 months after completion of the award.

How to apply

All applications must be submitted via the Academy's online application system (<https://grants.raeng.org.uk>). The lead applicant must first register with the system and provide some basic log-in details to create a profile.

The application form has 6 main sections and should take approximately one hour to complete, assuming you have written your answers to the questions offline and merely need to enter the information, rather than compose it.

The lead UK applicant will need to provide a letter from the appropriate Research Grants Office confirming the application is approved – details of this letter can be found below in section 4. Support and declarations. It is therefore recommended that you approach all necessary personnel as soon as possible. Due to the tight timelines for this application process, it is advised that you forewarn the relevant individuals even before the event, where possible.

If you have any questions concerning the application or the online application system please contact Alice Marks: alice.marks@raeng.org.uk

Completing the application form

After logging in to the online system and selecting "Frontiers of Engineering for Development – seed funding" you should be presented with the 'Instructions' screen. Here you will see some general instructions on how to use the system as well as the following list of the five sections of the application form:

1. Applicant and institution details
2. Project details
3. Challenge details
4. Goals, objectives and outcomes
5. Support and declaration

At any stage in the application process you can save your progress and return to the application at a later time. You can answer the questions in any order you like so it is possible to skip some sections and return later.

¹ <http://www.raeng.org.uk/publications/other/academy-diversity-policy>

1. Applicant and Institution details

Please provide details of researchers and their respective institutions involved in this project.

Q - Please provide contact details of the Lead and Co-Applicant(s)

These are the details we will use to contact the leading applicants. The lead applicant must be from a UK university, and fit the person specification outlined above. At least two of the lead and/or co-applicants must have been at the most recent Frontiers of Engineering for Development event.

Q - Researcher details

Please provide details of **every** researcher participating in the collaboration, highlighting their expertise, their discipline and what they will contribute to the project. (maximum 200 words per person)

Q - CVs of the main applicants

Please upload CVs of the lead and the co-applicants participating in the collaboration.

The format and content of the CVs is left to your discretion, but should include a list of publications. You do not need to include contact details as these are included earlier in the application. **Each CV must not exceed three pages, and should be submitted as one document in PDF format.**

2. Project details

Here you will provide the main summary details for the application, the costs, and an abstract of the proposed activities.

Q - Project Title

The essence of the research should be captured in the title and should be as informative as possible. Please use no more than ten words and ensure that it is understandable to a non-specialist reader (maximum 10 words)

Q - Abstract

The project summary should provide an overview of the interdisciplinary engineering challenge you are addressing, brief overview of your aims, the programme of activities and the benefits of the research to be undertaken during the collaboration. The summary should be written in language that can be understood by a non-specialist reader (maximum 300 words)

Q - Total project cost

The value requested should be between £10,000 and £30,000.

Q - Start and end date

Please enter the start and end date of the proposed collaboration. The Award must start on or before **29 June 2018** and end on or before **28 June 2019**.

Please note that a final report, including a financial statement, must be submitted on or before 28 June 2019, so please ensure you leave time to complete this at the end of your project.

Q - Is this a new collaboration?

Please confirm that this is a new collaboration, as pre-existing collaborations are not eligible.

3. Challenge details

Q – Challenge area

Please select a maximum of three global challenge areas as listed in the form. If you feel that it will address more than three, please choose the areas where you feel it will have the greatest impact. Please note that selecting more than one area will not necessarily strengthen your application – indeed, a lack of clarity on what you are trying to achieve may count against you! We recommend you only select more than one or two challenge areas by exception.

Q – Please select the DAC list country that will principally directly benefit from this proposal

Please select from the list the DAC list country that will benefit mainly and directly from your proposal (see list via <http://bit.ly/DACLIST>)

Q – Please list any other DAC list countries or regions that will directly benefit from this proposal

Please list any other countries or regions on the DAC list that will directly benefit from the project. This should take the form of a list, NOT an explanation. While a successful project may have the potential to be rolled out in other countries we recommend that you are as specific as possible as to which countries this early phase of the project will directly benefit. Remember, being specific will count in your favour. (Maximum 10 words)

Q – Official Development Assistance

Please explain how the collaborative project will address the challenge identified in the country or countries listed. You should focus on a specific engineering research challenge that will enhance social welfare and economic development in developing countries.

For more guidance on ODA, please refer to Global Challenges Research Fund Guidance available via: www.ukri.org/research/global-challenges-research-fund/ (maximum 400 words)

4. Goals, objectives and outcomes

Q - Goals and objectives

Please list the main objectives the project will achieve and explain how they benefit from an interdisciplinary approach. In our experience, the most successful projects have specific and realistic objectives that are time sensitive. (maximum 400 words)

Q - The main activities to be undertaken

Describe the programme of work in the format of a list of the research activities and milestones that will be used to measure progress. You should include how you will measure success, and make sure you have built enough time into your proposal to carry out the activities. (maximum 800 words)

Q – Pictures and Diagrams (optional)

Upload any pictures and/or diagrams related to your project in **a single pdf document**.

Q - The expected outcomes and impacts of the project

Please list the expected outcomes of the project and identify who will benefit from the research, as well as any societal and economic impacts it will have. (maximum 400 words)

Q - Justification of costs

Please provide a breakdown of the funding requested. The total contribution from the Academy must be between £10,000 and £30,000. The amount requested must be an accurate and reasonable reflection of what you expect to spend. Allowable costs and funding guidelines are as follows:

- There is no set limit on how much you can claim between the directly incurred cost headings, i.e. travel and subsistence, consumables, other costs. 'Consumables' include project specific costs of small equipment, computer software licenses or publication costs. Examples of 'other costs' are conferences and seminar fees.
- Please note that the funding provided by this scheme is **not** calculated on the basis of full economic costs.
- The totals may come to more than the maximum funding you can request under this scheme. Additional costs must be met by the participating Institutions. If the amount noted is higher than the award can provide, please state the contribution to be made by each institution.
- Exchanges do not need to be continuous and applicants may incorporate breaks between the visits. Any such breaks between visits do not count towards the length of the visits, and so should be ignored when calculating the funding requested.
- **At the end of the project, any excess funding awarded will be repayable to the Academy.**
- The funding provided is **not** a salary for the researchers, but a grant to cover their travel, accommodation, living expenses and visas. This can include covering these costs for undergraduate master students, master students, or PhD students BUT PhD student salaries are NOT eligible.
- The host institution can claim up to £2,500.00 as a contribution to project management, administrative and other running costs.
- The funding provided can only be used for the researchers named in the application.
- Allowable costs are any directly incurred costs to carry out the project. These may include costs related to travel and subsistence for students or researchers.
- Subsistence costs should reflect the normal rates applied at the host institution/s. All other costs for which you are seeking support should be based on the most economical option available.

When completing this section, please provide a narrative description of what resources are being requested and why. It should include:

- All necessary justification for costs and the duration of the travel
- Travel, consumables and equipment, visa fees, student subsistence costs, hosting events, etc.

Payments will be made to the UK institution and it is up to the collaborating partners to decide how to distribute funds in the most effective way to enable the project to take place. (maximum 400 words)

5. Support and declarations

Q – UK Institution/university declaration

The purpose of the declaration is to confirm that the application is acceptable in principle to the UK research institution/university, and that it has received all necessary internal authorisations.

The declaration terms must be transferred to headed paper and be signed by an appropriate officer from the Research Grants Office or equivalent (i.e. the body which administers grant applications) of the Lead applicant's institution/university. A scanned copy of the letter should be uploaded by the applicant. We do not require a hard copy.

A summary of the terms that the declaration must contain is shown below – it is important that the **exact phrasing is used**. Please **copy this table directly** into the declaration:

The applicant will be employed by the institution/university for the duration of the award.	
The applicant and any co-applicant(s) will be given full access to the facilities, equipment, personnel and funding as required by the application.	
The costs submitted in the application are correct and sufficient to complete the award as envisaged. Any shortfall in funding will be met by the institution/university.	

Assessment of applications

Applicants will be evaluated by a specially-convened panel of Academy Fellows with expertise spanning the breadth of engineering. Each application will be assessed by a minimum of two panel members, one of who will have technical expertise of the application, and the other will be a generalist reviewer. Reviews are followed by a Sift Panel, where the final decision is made. You will be informed of the outcome of your application by mid-June 2018.

All applications will be assessed against the following criteria:

1. **ODA compliance.**

- Is the aim to promote the welfare and economic development of a country or countries on the DAC list of ODA recipients?
- Is it designed to address a development need, and
- Is the focus on developing country problems?

2. **The Research Project**

- Quality of the proposed research programme including: vision, goals, and interdisciplinary approach, pathway to impact, and dissemination
- Quality of the applicants' research track record, the proposed collaborative activities between the applicants and how they complement each other, and any other researchers involved.

3. **The outcome and Impact**

- Potential benefits and impact of the project
- Potential impact on development challenge identified, and/or on economic growth and social development in developing countries.

EXPECTED STANDARDS OF BEHAVIOUR: GUIDANCE FOR PARTICIPANTS AT INTERNATIONAL PROGRAMME EVENTS

To achieve a successful, professional event without any participant, awardee, staff member or involved party feeling uncomfortable, threatened, demeaned or excluded, we will not tolerate behaviours that do not treat all persons fairly and with respect.

For the avoidance of doubt, the following behaviours will not be tolerated:

- The use, possession or attempt to purchase drugs that are illegal.
- Illegally downloading or viewing objectionable internet material.
- Statements about the attractiveness or otherwise of others.
- Statements that draw attention to disability, skin colour, sexual orientation, gender, ethnicity, nationality, age, religion or other characteristics in a way that could cause offence or exclusion.
- Aggressive, threatening or disruptive behaviour.
- Uninvited physical contact.

This list is not exhaustive, and other behaviours may also lead to action if judged inappropriate or unprofessional. The Engineering Council's Guidance for Institution Codes of Conduct provides a framework for assessing unprofessional behaviour:

<https://www.engc.org.uk/engcdocuments/internet/website/Guidelines%20for%20Institution%20Codes%20of%20Conduct.pdf>

In the first instance, if participants are concerned about unprofessional behaviour, they should report it to a member of Royal Academy of Engineering staff who will act quickly to ensure an appropriate response. Please be assured that these reports are encouraged and will be treated confidentially.

The Academy reserves the right to exclude people from further participation in its activities, and pass evidence to the appropriate authorities for serious and/or repeated unprofessional behaviour.

January 2018

SOCIAL MEDIA TOOLKIT FOR FRONTIERS OF ENGINEERING FOR DEVELOPMENT SYMPOSIA 29 APRIL-2 MAY 2018

Thank you for attending **#FOEDev** 2018. We're excited to bring together the top emerging UK and global engineering leaders from industry and academia to discuss pioneering technical work and cutting-edge research for international development from a diversity of engineering fields.

We encourage all attendees to join us in sharing highlights from your experience at our first symposia of 2018!

The Toolkit is a roadmap of helpful information, resources and examples that you can use to connect with other attendees, get real-time news and share your experience.

Join the conversation

To join the conversation at this year's symposia, or to simply follow along, be sure to keep track of the Royal Academy of Engineering on Twitter.

- Use and follow **#FOEDev** to join the conversation, share your experiences and perspectives, and see what others at the conference are saying.
- Follow **@RAEngGlobal** to keep track of The Royal Academy of Engineering's global activities
- Follow Event Chair Dr David GreenField **@DrResources**

How you can use social media

- **Facebook** and **LinkedIn** and your institution or company websites are also great platforms to share your experiences from the Frontiers of Development symposium. Remember to tag the Royal Academy of Engineering **on Facebook** (facebook.com/RAEngineering) and **on LinkedIn** (linkedin.com/company/the-royal-academy-of-engineering/)!

We'd love if you could post on social media to:

- Share interesting and helpful take-aways from sessions.
- Share links to online resources that other attendees might also find useful.
- Post photos from the sessions or other social gatherings of you and your colleagues.
- Share news stories about the symposia or other relevant topics.

Top tips for social media engagement

1. **Use images!** Posts with images secure more engagement, meaning more people will see your posts
2. **Tap into relevant hashtags:** as well as using **#FOEDev** also use subject specific hashtags, **#circulareconomy**, **#circular** **#wastefree**, **#plasticfree**, to reach as many people as possible.
3. **Adhere to your institution's social media policy:** If your institution is active on social media, it is likely they have a social media policy. If your tweets represent your work and/or institution you should be familiar with and follow their social media policy.
4. **Tag people** – if you are sharing a post about a speaker or exhibitor of the event, don't forget to tag them! If they are not on social media, you may like to tag their institution instead.
5. **Converse** – social media isn't just about broadcasting – it's also a great way to engage in dialogue and build new relationships. Reply to posts and share other people's content to continue the discussion.
6. **Link elsewhere where relevant** – social media posts are, by their nature, quite brief. If you want to reference further work, provide a link to where people can find more information. You might want to have a few links ready ahead of time.

Example content

- Excited to be in **#London** for the **@RAEngGlobal #FOEDev** symposium, which is bringing together engineering leaders in academia and industry to solve global development issues
- How can we look beyond a linear "take-make-consume-dispose" consumption model to a more **#circulareconomy**? Interesting discussions taking place at **@RAEngGlobal #FOEDev** symposium!
- Re-thinking how we use resources to create a **#circulareconomy** requires **#innovation** and collaboration to re-engineer the system to actively build economic, natural and social capital **#FOEDev**

Useful links

Please visit www.raeng.org.uk/foe for more information about the symposium.

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