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SPF Clean Air

Programme overview and opportunities

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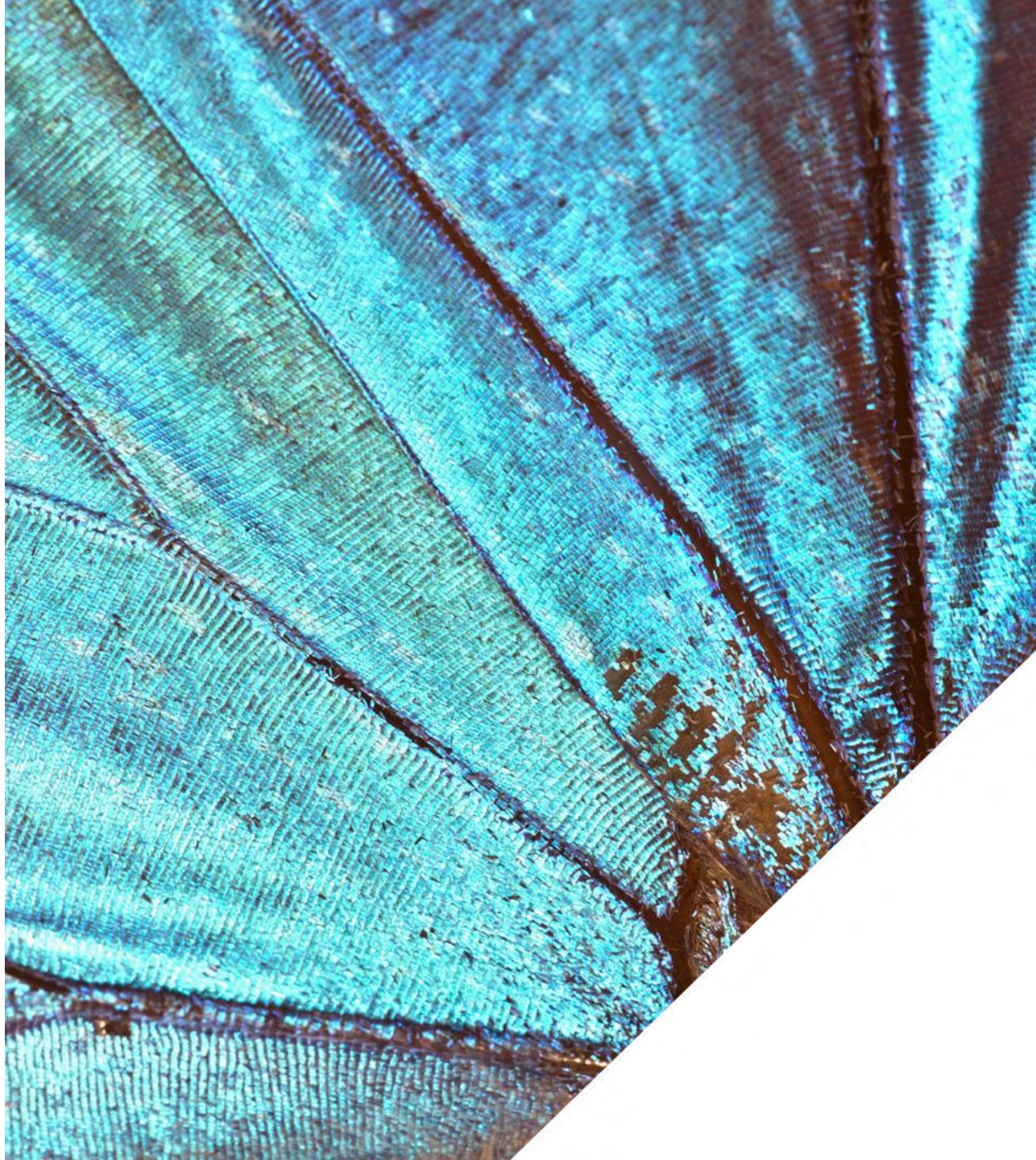
15 January 2020

Content



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We work with the government to invest over £7 billion a year in research and innovation by partnering with academia and industry to make the impossible, possible. Through the UK's nine leading academic and industrial funding councils, we create **knowledge with impact**.

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Strategic Priorities Fund

The Strategic Priorities Fund (SPF) is being led by UKRI to:

- drive an increase in high quality multi- and interdisciplinary research and innovation
- ensure that UKRI's investment links up effectively with government research priorities and opportunities
- and ensure the system responds to strategic priorities and opportunities

SPF builds on Paul Nurse's vision of a 'common fund', to support high quality multidisciplinary and interdisciplinary research programmes, which could have otherwise been missed through traditional funding channels

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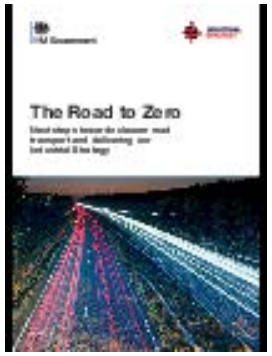
Motivation for a Clean Air Programme

Atmospheric pollution in the UK is responsible for approximately 40,000 early deaths and has a cost of around £20 billion to health services and business, per year.

The UK is entering a transformative period in air quality, as transport, heating, energy, solvent use and agricultural emissions change. Most of the 'easy wins' to reduce particulate matter, volatile organic compounds, ammonia and nitrogen oxides have already been implemented in the UK.

Future improvements will require innovative solutions underpinned by new research to protect the health of society, whilst pursuing clean growth.



UKRI Met Office NPL National Physical Laboratory Department for Environment Food & Rural Affairs Department of Health & Social Care Department for Transport The Scottish Government Riaghaltas na h-Alba Llywodraeth Cymru Welsh Government

Clean Air Aims

Wave 1 Analysis & Solutions (£19.6m)

Developing solutions to air pollution to help policymakers and businesses protect health and work towards a cleaner economy

- Drive forward new multidisciplinary research and innovation
- Leverage existing UK investments and enable a challenge-focussed multidisciplinary community to work together for the first time
- Inform implementation of the Clean Air Strategy and related strategies
- Develop new solutions to reduce emissions and protect public health, whilst avoiding perverse consequences

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Intended outcomes

- Increased knowledge of future changes in sources, emissions and atmospheric processes
- Increased knowledge of exposure and health impacts of vulnerable groups of people
- Catalyse innovation in technology, business models & policy best practice
- Bring coherence to UK air quality research and policy

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Wave 1 investments

- **Clean Air Champions** to maximise links across the programme, knowledge exchange, business convening, and links into international efforts, and start to refine the priorities for future investment
- Innovation funding competition for UK businesses with solutions to work on **product and service development**, and first deployments of technologies to tackle non-exhaust and non-road-vehicle air pollution
- Activities to network and leverage existing UKRI major, long-term strategic investments in order to support **multidisciplinary policy-relevant research** to underpin sustainable solutions for air quality
- Activities to develop a **systems framework for clean air analysis**

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Clean Air Champions

The Champions will bring together the UK's world-class air quality research base to develop practical solutions for air quality issues.

"The Clean Air projects will create the foundation for interdisciplinary research to understand and tackle air quality issues, drawing on the existing strengths of the UK's world-class research base. This is a timely programme that will enhance our capability to respond to current and future threats to public health and build a more resilient, cleaner economy"

Professor Stephen Holgate

Professor Martin Williams

Dr Jenny Baverstock

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Innovation Competition

Develop and demonstrate new products or services which reduce the harmful emissions from one or more of:

- road vehicle brake and tyre wear and/or road surface wear
- non-road mobile machinery used for construction, such as excavators, bulldozers, front loaders, cranes and compressors
- transport refrigeration units

Brake, tyre, road wear	TRU	Construction NRMM

Project
Auto-Align - Reducing Air Pollution through Measurement of Wheel Alignment (RL Capital)
Cool Run: Hubl's solution to multi-temperature last mile delivery (Hubl Logistics Ltd)
CAGE Clean Air Gas Engine (OakTec)
SHIELD: Series Hybrid-capable Intelligent Electric Loader Drive (Edrive engineering services Ltd)
Food Transport Refrigeration with Engine Exhaust and Metal Hydride Reactors (University of South Wales)
ENSO - Low-Emission Tyres for Improved Air Quality (Enso Tyres Ltd)

Multidisciplinary policy-relevant research

- **APEx:** An Air Pollution Exposure model to integrate protection of vulnerable groups into the UK Clean Air Programme. (Ben Barratt, MRC CEH)
- **ANTICIPATE**: Actively anticipating the unintended consequences on air quality of future public policies (Nigel Gilbert, CECAN)
- **DREaM:** Component-Specific Air pollutant Drivers of Disease Risk in Early to Midlife: a pathway approach (Ian Mudway, MRC CEH)
- **OSCA:** Integrated Research Observation System for Clean Air (Hugh Coe, NERC Air pollution supersites)
- **QUANT:** Quantification of Utility of Atmospheric Network Technologies. (Pete Edwards, NCAS)

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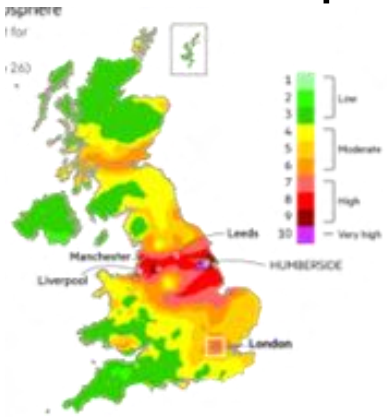
SPF Clean Air Met Office Coordinated Work

External Projects

- NPL - Metrology of air quality measurements
- Recent calls for:
  - UK Community Emission Modelling System
  - Urban outdoor air quality modelling
  - Data integration model for exposure modelling

MetO aircraft – with AQ sensor load



UK forecasting/modelling

Met Office Internal Activities

- Community engagement & events
- Online framework for data discovery, use and analysis
- 12-month air quality flight campaign and model analysis
- 15-year UK air quality reanalysis
- New high resolution (~km grid length) national air quality forecast
- Urban NWP (~100 m grid length) for air quality

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Clean Air – motivation for wave 2

The scientific, technical, behavioural and policy approaches used to assess and manage exposure to air pollution need radical change to reflect the indoor/outdoor continuum of exposure.

Human exposure to air pollution occurs in the home, at school and in workplaces, whilst travelling, and during leisure activities.

Managing human exposure to the very smallest airborne particulate matter (PM1 and ultra-fine PM) and the complex cocktail of volatile organic compounds (VOCs) is likely to grow in health significance as concentrations of larger primary particles (e.g. PM10 and nitrates from tailpipe No_x) decline.

Indoor air quality is dynamic: the introduction of new emissions in the indoor environment together with the trend towards more energy efficient buildings (impacting insulation/ventilation) will increase indoor air exposures.

It will no longer be effective to attempt to manage public health impacts solely through controlling outdoor sources.

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Social Perspective

How do technological, economic, policy or demographic changes influence scenarios of the likely changing pollutant mixture for the 2020s-30s, taking into account large-scale drivers such as changing behaviour, urbanisation, climate change, and land use change?

What physical and behavioural factors influence human exposure and health impacts from air pollution for vulnerable groups, throughout the life-course, and those facing health inequalities linked to social justice and identify how we might measure these factors?

Can we enable design of effective intervention and prevention strategies, through measurements, models that deliver real-world insights, and novel data resources?

Clean Air Aims

Wave 2 Indoor/Outdoor Interface (£22m)

Tackling new air quality challenges related to changing emissions and exposure patterns, to protect health and support clean growth

- Build a new UK interdisciplinary community
- Deliver new knowledge on emerging air pollution challenges, associated health risks and human behavioural change and practices
- Provide consistent, evidence-based advice for stakeholders
- Develop sustainable products and services to protect health and grow UK businesses

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Clean Air – Wave 2 Timeline and Activities

Led by NERC

- Networks to build interdisciplinary communities to address air quality challenges at the indoor/outdoor interface
- Interdisciplinary research and innovation consortia to generate new knowledge and tools to influence policy and regulation

Led by IUK

- Business-led innovation projects to develop new clean air products and services for the indoor environment

Led by Met Office

- Further development of the Clean Air analysis framework to provide open data and tools

Activities led by the Clean Air Champions to coordinate and integrate activities across the programme, and to maximise the impact of the larger portfolio

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Networks - Ambitions

To fund a cohort of networks that will start to build a new influential UK interdisciplinary research and stakeholder community in the area of the indoor/outdoor air quality interface.

Up to £3m is available to support approximately 6 networks at up to £0.5 m (80%FEC) each for 3 years from 1 July 2020.

It is expected that all successful networks funded through this call will work closely together, as well as liaise with relevant UKRI investments (both within and beyond the SPF Clean Air programme) in order to understand and inform the larger landscape, maximise any capacity building and avoid duplication of activities.

Closing date 21 January 2020

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Networks – Call Scope

It is anticipated that successful networks will define an interdisciplinary challenges aligned with the aims and objectives of the second wave of funding and propose a vision for the network and a programme of work that will:

- identifies and engages diverse stakeholders in the development of a shared research agenda, which will build consensus on future research pathways and enhance opportunities for uptake of research outcomes and eventual impact;
- encourages broad participation and stimulates activity widely (including internationally) to draw in members from relevant disciplines, different backgrounds and career stages to grow capability;
- encourages interdisciplinary approaches to understanding emerging air pollution threats and their direct impacts on human health;
- enables novel or risky new ideas for tackling air quality challenges across the indoor/outdoor interface to emerge; and
- provides a focal point for sustained coordination of research areas aligned to the programme.

Networks – Call Scope

- **Core staff time to manage the network**
- **Engagement and networking:**
  - Communication and engagement strategy that involves stakeholders throughout the activity programme.
  - Facilitate the development of effective and sustained partnerships across the disciplines between academics, PSRE researchers, stakeholders from health systems, policy, practice, regulation, industry, 3rd sector and public where appropriate to the identified challenge.
  - Engagement approaches could include: workshops, seminars, meetings, or other innovative methods.
- **Small research activities**:
  - A proportion of the funds (commensurate with the reach of the network) to support small research activities between its members. This may include:
    - Scoping or feasibility studies
    - Expert working groups
    - Placements or exchanges
    - ECR activities
    - other innovative activities.

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Consortia scoping

28 January 2020 (Leeds) and 11 February 2020 (Birmingham)

Aims

- communicate the remit and objectives of the Clean Air programme
- bring together researchers and stakeholders from diverse disciplines with interests in managing public health impacts of air pollution exposure at the indoor/outdoor interface
- seek input on the research and innovation challenges and opportunities relative to the aims of the programme
- inform the scope of future multi- and inter-disciplinary funding opportunities

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