

Lancaster University internal application for GCRF Research Funding

Up to £30K can be requested to fund short-term work in support of a future significant ODA compliant research project.

Please complete this form in full and return it to researchdevelopment@lancaster.ac.uk by **5pm (GMT) on Thursday 11th March 2021**. Late applications will not be accepted.

The PI must:

- Be confident that the funding awarded can be spent in full by 31st July 2021 and all activities completed by this date.
- Have a strong track record, capable of applying for and leading a significant research project in the near future.

Activities should:

- Be ODA compliant i.e. Seek to investigate a specific problem or specific outcome which will have as its primary outcome real impact on the economic development and/or welfare of a developing country/ies as its main objective.
- Provide evidence, lay the groundwork for, or generate pilot data towards a significant future research project application (a Big Bold Bid).
- Note – bid development itself is NOT an eligible cost.

Eligible costs include:

- Appointment of a fixed-term researcher to conduct pilot work, small-related consumables, and/or to collect evidence of research need with relevant stakeholders / available resources.
- Associated costs of developing networks, running workshops (which could be virtual) and capacity building activities with relevant DAC list country partners.
- Funding can be used to support justified costs of RO partners performing pilot work within LMICs
- Travel as restrictions allow (and within the time frame).
- Funding cannot be used to buy equipment or general administration time.

Applicant and project details

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| Name(s) of applicant | Dr. Binoy Sarkar, Prof. Kirk Semple |
| Department (s) | Lancaster Environment Centre |
| Title of project: | Tackling Pharmaceutical and Personal Care Product Pollutants in the North-Western Himalayan Region of India |

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| <u>DAC List</u> Country/countries involved in the proposed project: | India |
| DAC list partners: | <p>Dr. Santanu Mukherjee (Indian PI), MS Swaminathan School of Agriculture, Shoolini University, Himachal Pradesh, India.</p> <p>Prof. Gurjot Kaur (Collaborator), School of Pharmaceutical Sciences, Shoolini University, Himachal Pradesh, India.</p> <p>Prof. S.K. Bhardwaj (Collaborator), Dr. YS Parmar University of Horticulture and Forestry, Himachal Pradesh, India.</p> <p>Dr. Renu Lata (Collaborator), G.B. Pant National Institute of Himalayan Environment, Himachal Regional Centre, Himachal Pradesh, India.</p> <p>Dr. Biraj Bandhu Basak (Collaborator), ICAR-Directorate of Medicinal and Aromatic Plants Research, Gujrat, India.</p> <p>Dr. Atanu Banerjee (Collaborator), Dr. KC Patel R&D Centre, Charotar University of Science and Technology, Gujrat, India.</p> <p>Dr. Raj Mukhopadhyay (Collaborator), Division of Irrigation and Drainage Engineering, ICAR-Central Soil Salinity Research Institute, Haryana, India</p> <p>Prof. Meththika Vithanage (Collaborator), Ecosphere Resilience Research Centre, University of Sri Jayewardenepura, Sri Lanka.</p> |

Proposed Activities

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| Briefly outline the activities proposed, including a timetable (250 words max) |
| <p>This project aims to understand the current status of origin and dissipation of pharmaceutical and personal care product (PPCP) pollutants and people’s perception of the issue in the Baddi-Barotiwala-Nalagarh (BBN) region which is considered as a major pharmaceutical hub in the Himachal Pradesh State of India. The North-Western Himalayan (NWH) BBN region consisting of 229 villages also hosts a cluster of plastic, rubber, cement, pulp and paper, dyes, and textile industries impacting the soil and water environments through their discharges.</p> <p>Aiming to build a UK-India partnership at the first phase, this project will undertake the following activities:</p> <ol style="list-style-type: none"> 1. Preparation of a site inventory (April-July): A survey involving inhabitants of the region (with 50 villages at phase 1) and interviews with ward officials and linespersons. |

2. **Science to understand PPCP dissipation (April-July):** Analysis of water samples (pre- and post-monsoon period) from the Sirsa River and tributaries of Sutlej (upstream and downstream) flowing nearby the study areas.
3. **Networking event (July):** An online networking session to reflect on preliminary outcomes and brainstorming for future significant project development.

Outline how the proposed research builds on your expertise and research profile to date (250 words max)

Dr. Binoy Sarkar (UK PI) has nearly ten years of research experience, especially looking at interactions of organic and inorganic contaminants with clay minerals, biochar and nanoparticles in soil and water. He has published 134 peer-reviewed journal articles with a Google Scholar h-index 35.

Key projects:

- GCRF seed project at The University of Sheffield (£23,000; Co-Investigator; Arsenic in the food chain: problems and perspectives of local farming communities in India and Bangladesh).
- Australian Department of Defence (through Cooperative Research Centre for Contamination Assessment & Remediation of the Environment) two grants (£266,000 total; Chief Investigator; Modified natural materials for remediation of hazardous chemicals).

Prof. Kirk Semple (UK Co-PI) holds more than 30 years of research experience focussing on processes affecting organic contaminant-biota interactions in soils, availability of organic contaminant residues in soils and risk assessment and bioremediation of contaminated land.

Key projects:

- Accelerating the adoption of circular sanitation demonstration systems for improved health outcomes (ACTUATE; GCRF funded).
- Driving Eco-Innovation in Africa: capacity building for a safe circular water economy (RECIRCULATE; GCRF funded).

Dr. Santanu Mukherjee (India PI) holds five years of research experience in the fate transformation of emerging contaminants and nutrients. He obtained his PhD from the University of Bonn and worked at Forschungszentrum Jülich and Savannah River Ecological Laboratory as a visiting researcher.

Key project:

- Science and Engineering Research Board, Govt. of India (£22,024; Principal Investigator; Development of low-cost novel biomaterials for in-situ groundwater/soil remediation: A safe drinking water production perspective).

Funding requested

Describe briefly how much funding is requested with a breakdown of costs*Up to £30K can be requested.**The Funds must be spent by 31st July 2021.***1. Manpower [2 Research Associates (RA) in India]: £4,400**£550 per RA per month x 2 RAs x 4 months = £4,400

Both the RAs will be based at the Indian PI's institute (Shoolini University, Himachal Pradesh). RA #1 will conduct the questionnaire survey in the selected 50 villages by frequent trips and analyse the survey data. RA #2 will perform snowball sampling (during pre-and post-monsoon periods) and analyse water samples from the 5 catchment areas (40 samples from each area) of the Sirsa Watershed. The RAs will contribute to the preparation of the **site inventory** and generation of **preliminary data** enabling to prepare a health risk assessment map of the selected region.

2. Consumables: £5,020

(a) Purchase of analytical standards :

i. PPCP standards

£200 per standard x 4 standards = £800

Four PPCP standards (ciprofloxacin, norfloxacin, citalopram and cetirizine) will be procured for their accurate detection and quantification in water samples. The four PPCP compounds are chosen based on their frequent detection/occurrence in the study region.

In-house instrumental facilities [(Thermo Fisher Scientific UHPLC; Model: Dionex UltiMate 3000 with Autosampler, Detectors: Diode Array Detector (DAD), Fluorescence Detector (FLD), RefractoMax Detector (RID) and Thermo Fisher Scientific GC-MS/MS; Model GC: Trace 1300; MS: ISQ Duo with NIST Library 2.2, 2014; Compatible for both liquid and head space analysis] are available at Shoolini University where Dr Santanu Mukherjee (Indian PI) is based.

ii. Heavy metals standards :

£180 per standard x 1 standard = £180

The above Multielement standard solution 1 for ICP (TraceCERT®, in 10% nitric acid) will be used (will act as CRM material) for measuring a suite of heavy metals (20) in the collected water samples using In-house instrumental facilities [(ICP-OES, Model: Thermo Fisher Scientific, USA iCAP 7000 Series, ICP Spectrometer Autosampler: ASX-280, For Elemental analysis including heavy metals).

(b) Analytical measurement charges:

£3 per sample x 400 samples = £1,200

Total 400 water samples will be analysed (200 samples pre-monsoon and 200 samples post-monsoon; 5 catchment areas; 40 samples from each catchment area).

No costs are requested for the analysis of basic water-quality parameters (pH, TDS, turbidity, dissolved oxygen, BOD/COD, nitrate, sulphates, dissolved total organic matter) since all required facilities for these analyses are available free of cost at Dr Mukherjee's institute.

(c) Purchase of labware:

Total labware cost = £2040

Around 400 HDPE sampling bottles (1 L), glassware, chemicals, two ice-containers (cool box), syringe filter (£140), Pipette sets (2) and tips (£400) etc.

(d) Travel:

£50 per trip x 4 times x 4 months = £800

Travelling to villages is required to collect survey data and water samples (at least 4 times in a month).

3. Advertising of positions: £150

Total funding requested: £9,570

Please complete this form in full and return it to researchdevelopment@lancaster.ac.uk by **5pm on Thursday 11th March 2021**

Date: 31st March 2021

Reference – Award of Lancaster University GCRF Funding

Dr Binoy Sarkar and Professor Kirk Semple
Lancaster Environment Centre
Lancaster University, UK

Dear Dr Sarkar and Professor Semple

I am delighted to inform you that your project 'Tackling Pharmaceutical and Personal Care Product Pollutants in the North-Western Himalayan Region of India' has been successful in securing funding from the University's internal GCRF Research Funding Scheme.

We note that this work will be conducted in collaboration with Dr Santanu Mukherjee from the MS Swaminathan School of Agriculture, Shoolini University, Himachal Pradesh, India, with Dr Santanu Mukherjee acting as the lead partner investigator in India.

This pilot project will run from 1st April 2021 - 31st July 2021 and has a total budget expenditure of £9,570.

Please note that project spend should be conducted as outlined in your application and that activity should remain ODA compliant throughout.

I look forward to hearing about the progress made in these activities later this year.

Kind regards

A Dillon

Dr Mandy Dillon
Senior Research Development Manager

Research and Enterprise Services
Lancaster University
Bailrigg Campus
Lancaster, UK