



ROYAL
ACADEMY OF
ENGINEERING

Industry-Academia Partnership Programme



INDIA

Under its remit as a delivery partner of the Newton Fund, the Royal Academy of Engineering has partnered with the Federation of Indian Chambers of Commerce and Industry to enhance engineering teaching, research and innovation outcomes in Indian Tier 2 and Tier 3 universities by building bilateral industry-academia links.

Transforming global health through computational cookstove design is one of the projects funded through this scheme. It brings together academics from Amrita Vishwa Vidyapeetham (Amrita) in India, the Indian Institute of Technology (IIT) Madras and Imperial College London in the UK along with an industrial partner in India, Prakti, a social enterprise dedicated to innovative cookstove design. Together they aim to improve cookstove design and establish a collaborative model with a lasting impact on both education and innovation.



**Newton
Fund**



BUILDING COLLABORATIVE PARTNERSHIPS

During a summer placement, two undergraduate students from Imperial College London worked with Prakti, leading to a final year research project for the students, which identified how computational fluid dynamics (CFD) could be used to improve the development of cookstoves.

This developed into a wider project that brings together four partners with complementary skills across engineering teaching and research, funded by the UK India Industry-Academia Partnership Programme. Collaborators includes Amrita, a Tier 2 university with expertise in using CFD to optimise design, and IIT Madras, whose researchers have experience in designing relevant combustion models that can be incorporated into CFD code.

"This scheme was an ideal way to build on promising initial results we'd achieved, while providing the impetus to foster new collaborations in India," explains Professor Omar Matar, Imperial College London. "Our long-term aim is to build a consortium that generates lasting impact on the ground, where it matters most."

IMPACT AND INNOVATION

Simple wood-fired cookstoves can be found in the homes of millions of families in India and worldwide. Their emissions, such as carbon monoxide, can be harmful to health so there is a global drive to identify alternative, affordable, low-emission options.

"We want to develop a clean cookstove that people like to use and want to pay money for," explains Dr Mouhsine Serrar, CEO, Prakti.

"However, our budget is limited, so the opportunity this scheme gave us to work with some of the best universities in the world is extremely valuable."

Use of CFD software drives innovation in cookstove design by reducing the costly and time-consuming prototyping process. The collaborators aim to strengthen research in this area and teach others how to engage with the technique.

MODELS OF ENGAGEMENT

A key goal is to establish a multidisciplinary summer school, inviting undergraduate students to gain a deeper understanding of CFD techniques for cookstove design. Students will be invited to engage their learning by competing to design the most efficient cookstove.

"The use of CFD modelling techniques for development and optimisation of clean cookstoves is novel," explains Dr Ratna Kishore, Amrita. "This project will help students gain a deep knowledge of CFD, not only for cookstove modelling, but for solving global problems generally."

Winning students will be offered placements with Prakti to build a physical prototype of their designs and test its emissions at the National Centre for Combustion Research and Development at IIT Madras.

In addition, students at Imperial College London will support the continued development of CFD modelling through undergraduate and postgraduate research projects.

FUTURE PLANS

While the project is in its early stages, partners are exploring options to make the summer school an annual event and there are plans to host a summer school at Imperial College London for UK researchers. Partners will also produce a video of the summer school to promote the project's outputs.

The long-term vision is for the partnership to become a wider consortium that will be strategically placed to attract funding for future work. Given their geographical proximity, it is also intended that Amrita, IIT Madras and Prakti will continue to collaborate and identify further opportunities for industry-related research projects for students and researchers.

"We hope that the CFD summer school will introduce highly talented Indian undergraduate students to Prakti, and raise awareness of the potential for engineers to work on unconventional problems with real social impact."

Dr Mouhsine Serrar, Prakti.

UK-INDIA INDUSTRY-ACADEMIA PARTNERSHIP

As a Newton Fund delivery partner, the Royal Academy of Engineering has partnered with the Federation of Indian Chambers of Commerce and Industry to fund projects that strengthen capacity and develop capabilities within Indian Tier 2 and Tier 3 engineering higher education and research institutions to carry out excellent teaching, research and innovation-related activities through collaboration with industry and UK counterparts.

NEWTON FUND

This project is supported by the Newton Fund, which is part of the UK's official development assistance (ODA) and promotes economic development and social welfare by strengthening science and innovation capacity.

For more information

W newtonfund.ac.uk

T @NewtonFund

Images: Cookstoves in India © Prakti Stoves, www.prakti.in