



Project Proposal for Ph.D.

Project Details (The research problem must clearly indicate the need for an interdisciplinary approach)

Project TitleExperimental Facility for Health Assessment of Household and Ritual Emissions

Project Summary

(Minimum 500 and maximum 2000 characters)

This project aims to develop a modular, low-emission exposure facility to investigate the health effects of culturally and domestically relevant combustion sources such as Havan (Hindu ritual burning), household cooking, and low-grade industrial fuel combustion, to name a few. Building upon an existing whole-body exposure (WBE) chamber designed for controlled gaseous engine exhaust exposure, the proposed system will integrate adaptable emission generation modules, multi-stage dilution and conditioning units, and a dynamically controlled exposure chamber.

The facility should be capable of handling low-volume, transient, and compositionally diverse emissions, enabling precise control over concentration, temperature, and exposure duration. A buffer-based mixing system combined with real-time monitoring will ensure uniform and repeatable exposure conditions. The design will allow selective exposure to gaseous, particulate, or combined phases, thereby addressing current gaps in isolating pollutant-specific health effects.

This platform will enable systematic investigation of dose-response relationships and physiological impacts under realistic exposure scenarios, particularly relevant to Indian socio-cultural practices and domestic environments. The proposed facility offers a cost-effective and scalable solution for interdisciplinary research linking combustion science, fluid mechanics, and biomedical studies.

Ph.D. Supervisors*
(Supervisor 1 and Supervisor 2 cannot be from the same department of IITD)

Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1*	Prof. Debabrata Dasgupta	Mechanical Engineering	debabrata@mech.iitd.ac.in
Supervisor 2	Dr. Asmita Patil	Department of Physiology, AIIMS New Delhi	asmitaiims@gmail.com

*Supervisor 1 must be from IIT, Delhi.
+All cells in this table are mandatory fields that need to be filled by faculty for consideration of proposal.
§The date of superannuation of supervisors should be at least three years from the date of registration of selected candidates.

Project requirements (Student qualifications, experience required, etc)
*The candidate will be shortlisted based on common shortlisting criteria decided by ScRC (SIRe)

- Students must hold both **BTech** and **MTech** degrees in **Mechanical Engineering** or allied disciplines.

Source of fellowship/funding and project number
(CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)

Institute assistantship

Role of Faculty Members involved:

Supervisor-1	Design, development, and optimization of the proposed exposure facility.
Supervisor-2	Design and execution of the biological exposure studies, ensuring medical relevance and scientific rigor

Note :-

1. **Approval from the respective DRC/CRC/ScRC of your Department/Centre/School will be required for using the "Full-time Institute Assistantship (Category-wise) (FIA)" for selecting the students in SIRe.**
2. **Declaration:- Faculty members, please ensure that you have at least 3 years of service left before superannuation along with adequate sitting space & lab facilities for the SIRe student.**
3. **PI/s are also encouraged to submit joint proposals with AIIMS, NII, JNU and institutes with which IITD has an existing MoU. If the Co-PI (Supervisor 2) is from outside IITD, kindly share his/her detailed CV.**
4. **If a research scholar is to be considered for selection under the project fellowship, then the project should have a minimum of two-year duration remaining.**
5. **A candidate applying with a valid JRF/INSPIRE/any national level fellowship should have at least two-year validity from the date of joining the Ph.D. program.**
6. **The third supervisor’s name (if required) can be added only after the formation of Student Research Committee (SRC) subject to a strong recommendation of SRC and subsequent approval from the competent authority.**
7. **If Institute fellowship is being sought, then DRC approval of the parent department of Supervisor 1 is required at the time of selection.**