Indian Institute of Technology Delhi

School of Interdisciplinary Research (SIRe)

SIRe Project Number

2025-01-19

(will be assigned by SIRe)

Project Proposal for Ph.D.

Project Details	
Project Title	Aerogels for Extreme Temperature Applications
Project Summary (Minimum 500 and maximum 2000 characters)	Aerogels, due to their nanoporous structure effectively minimizes all modes of heat transfer by conduction, convection, and radiation, and thus are regarded as the best thermal insulators. In applications where protection from high heat is required, aerogels can act as efficient heat shields. They can withstand extreme temperatures and provide a barrier to prevent heat transfer. The key objective of this project is to develop flexible, lightweight, and highly porous aerogels with excellent thermal insulation behaviour for aerospace applications.

Ph.D. Supervisors

Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Harun Venkatesan	Textile and Fibre Engineering, IIT Delhi	harun@iitd.ac.in
Supervisor 2	Krishna Bharadwaj Balasubramanian	Department of Material Science and Engineering	bkrishna@mse.iitd.ac.in

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

- B.Tech / ME / M.Tech/ MSc (Material Science and Engineering, Polymer science, Textile Chemistry, Textile Engineering, Material Science and Engineering, Chemical Engineering, Analytical Chemistry, Chemistry) or Equivalent from a recognized institute/university.

- Sol gel chemistry, material characterization, knowledge of fundamental textile/ apparel design concepts including fiber specification and testing, fabric characterization, textile manufacturing processes, etc.

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

Project Funding

Role of Faculty Members involved:	
Supervisor-1	Dr. Harun Venkatesan - Development of aerogels for thermal insulation properties. Dr. Harun Venkatesan received his PhD from the Institute of Textiles and Clothing at The Hong Kong Polytechnic University in 2020. Before joining IIT Delhi as an Assistant professor in 2022, he was a research fellow at The Hong Kong University of Science and Technology, supported by prestigious Research Talent Hub Postdoctoral Fellowship. His current research focus on development of aerogels for thermal insulation and radiative cooling properties.
Supervisor-2	Dr. Krishna Bharadwaj Balasubramanian – Development of 2D materials and characterization Dr. Krishna Balasubramanian did his bachelor's in electrical and electronics engineering at PSG College of Technology, Coimbatore. He worked for two years in the hardware design group of optical transport business unit, Cisco Systems Inc. He designed and implemented logical circuits using FPGAs and ASICs for high speed (upto 100 GHz) optical communication channels. Subsequently he joined as a direct PhD candidate at the Indian Institute of Science under the guidance of Prof. Rudra Pratap and Prof. Srinivasan Raghavan.