

Dr. Harishankar Kopperi – Expression of Interest (Sustain-FIT Fellowship Applicant)

Profile Summary:

Dr. Harishankar Kopperi is a sustainability researcher with a strong background in chemical and bioprocess engineering, carbon-to-chemicals pathways, and environmental systems analysis. He holds a Ph.D. in Chemical Sciences from CSIR-IIT (India), awarded in January 2025, and currently works as a Senior Research Associate at the Center for Study of Science, Technology and Policy (CSTEP), Bangalore. His work is at the interface of industrial decarbonization, carbon capture and utilization (CCU), and life cycle assessment (LCA) for clean energy and circular economy transitions. He has led and contributed to projects funded by the Department of Science and Technology (DST, India), Bill & Melinda Gates Foundation (BMGF), and Department of Biotechnology (DBT-India), including international collaborations with Denmark and Korea.

Proposed Project Title:

DecarbonX – Life Cycle and Economic Assessment of CO₂/CH₄-to-Chemicals Pathways for Industrial Transformation

Brief Project Summary:

This project aims to develop and assess low-carbon, scalable chemical production pathways that valorize industrial CO₂ and methane emissions into platform chemicals and fuels. Using a combination of techno-economic analysis (TEA), life cycle assessment (LCA), and planetary boundary evaluation, the project will create a decision-support framework for deploying sustainable CCU technologies aligned with the EU Green Deal, particularly in chemical, cement, and energy sectors. The work also envisions integration with renewable energy systems and bio-based co-feedstocks for circularity.

Research Interests and Expertise:

- Carbon Capture, Utilization and Storage (CCUS)
- Life Cycle Assessment (SimaPro, OpenLCA)
- Techno-Economic Analysis (SuperPro Designer)
- Waste valorization and biorefinery systems
- CO₂-to-chemicals/fuels pathways
- Circular economy and climate-smart industrial systems

Preferred Areas of Collaboration:

- I am particularly interested in joining host institutions with expertise in:
- Green chemistry or carbon-to-chemical innovation
- Circular and bio-based production systems
- Environmental process modeling and sustainability assessment
- Digital tools for industrial sustainability and policy support

I am also open to aligning the project scope with sustainable food systems, marine bioresources, or industrial biotechnology, including cross-sectoral opportunities involving LCA, bioproduct engineering, or green solvents.

Ideal Host Profiles:

Institutes or labs working on:

Industrial decarbonization through green technologies

Sustainable chemical engineering or process systems modeling

Marine bioresources, biopharma, or bio-solvents

Environmental impact modeling with policy or enterprise interface

Willingness to Adapt:

I am highly flexible and open to shaping the project direction to match the research priorities of the host institution. I bring interdisciplinary skills, policy exposure, and a strong work ethic and am ready to co-develop impactful solutions for global sustainability challenges.

Contact:

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