

Living and Sustainability: An Environmental Critique of Design and Building Practices, Locally and Globally

1. Paper / Proposal Title:

Sustainable Design interventions for the built environment: A synergistic study of computational fluid dynamics and art

2. Format:

Verbal Presentation followed by a written paper

3. Author(s) Name:

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4. University or Company Affiliation:

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5. Abstract (300 words):

The paper illustrates the coming together of Computational Fluid dynamics (CFD), Art and Architecture through an actual green building-The 'Fish House' - based in the French Enclave of Pondicherry, India. The 'Fish House' is an urban residential building being constructed in the town of Pondicherry. It is called the 'Fish House' because it

is housed opposite a fish market In a daring departure from the other buildings, the 'Fish House' will also combine the force and fluidity of simple line drawings to lend a stunning visual appeal to its facades, as part of Pondicherry city's urban regeneration programmes.

The building's sustainable facades will enhance its thermal comfort with optimal levels of daylighting, ventilation rates, and expected values for the Predicted Mean Vote (PMV). CFD Modelling indicates substantially low HVAC (Heating Ventilation and Air Conditioning) loads. Carefully constructed experiments are in progress for the first time ever to compute values for the heat transfer coefficient (U value in architectural parlance) for a 'khus' drape- an organic grass-based drape in use in India for centuries. This is a crucial parameter for quantifying heat transfer rates essential for the computation of indoor temperatures.

A new form of Art shall be appropriated on the building's hard edged clean external walls- coloured lines would not only decorate the building, but also be a counterpoint to the hard edged masculine rectangular construction. The colour of the ultramarine ink of the individual lines although static, will describe movement and form that unpredictably contrasts and expands in three dimensions. The paintings shall be an attempt to describe moving water or perhaps the movement of wind so essential to the Fish House Project .They will bring an energy and force to the environment. The main outcomes will appeal to mechanical engineers, fluid dynamists, structural engineers and green architects world-wide.

6. Author(s) Biography (200 words each):

Prof. Satyajit Ghosh is currently Senior Professor at the School of Mechanical Engineering, VIT University, India. He is also a member of the School of Earth and Environment, University of Leeds, UK. Previously, He has worked at the University of Cambridge on Environmental Fluid dynamics. Apart from being a leading cloud microphysicist, he teaches and researches on the generic themes of "Atmospheric Processes and Climate Change", Energy in the built Environment" among others. His papers have been published by the Royal Society of Great Britain and other leading scientific journals across the world. CNN-International and the BBC also covered stories on his research. He was recognized with the prestigious Atmospheric Science Letters Editor's award by the Royal Meteorological Society of Great Britain in 2012. His most recent research on a unique cyclone alerting system received world-wide publicity and the story was picked up by the international media. He has authored several books on the CFD of Built Architecture and they have been published Internationally.

Mona Doctor-Pingel is an architect based in Auroville since 1995. She studied architecture at the Center for Environment and Planning (CEPT), Ahmedabad, and has a Master's degree in Appropriate Technology from Flensburg University, Germany .

Her Studio Naqshbandi experiments with various building technologies using local materials and craftsmen which incorporate principles of Building Biology. She has been actively involved in different planning bodies of Auroville. Currently she is also part of the five year Indo-US joint research on Building Energy Efficiency. She is the author of a monograph on Poppo Pingel, which forms a part of the series of monographs on the pioneering architects of Auroville.

Tanya Ling is an artist and designer who make paintings, sculptures and drawings. Her career has traversed the Fashion Industry and Art World.

She studied at Central Saint Martin's, worked for Christian Lacroix before starting an art gallery back in London with her husband William Ling. She has made drawings for Louis Vuitton and Vogue and produced her own RTW collection.

In 2011 the V&A acquired over 50 of her drawings. In 2013 she was commissioned to create a Line Painting installation at The Mayor Gallery. In 2014 a group of paintings and sculptures were acquired by the Murderme collection. In 2015 she was invited by Tate to take over their Instagram account.

She works and lives in London and the South of France.

Vishnu Vardhan is pursuing his B.Tech degree in Mechanical Engineering with specialization in Energy Engineering. He is pursuing his final year thesis on the 'Fish House project' which is a design study of a green building in Pondicherry under the guidance of Professor Ghosh.

Shyam Srinivasan is pursuing his B.Tech degree in Biotech Engineering. He is pursuing his final year thesis on the 'Fish House project' which is a design study of a green building in Pondicherry under the guidance of Professor Ghosh. He is manager of the learning circles for Oikos Int., a Swiss based international organization concerned with social uplift.