

Abstract Submitted  
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**How Termite Mounds Breath?** SAURABH SAXENA, NEDA YAGHOBIAN, Florida State University — Fungus-cultivating termites of the sub-family Macrotermitinae that are extensively found throughout sub-Saharan Africa and south East Asia are one species of termites that collectively build massive, uninhabited, complex structures. These structures, which are much larger than the size of an individual termite, effectively use natural wind and solar energies and the energy embodied in colony's metabolic activity to maintain the necessary condition for termite survival. These mounds enclose a subterranean nest, where the termite live and cultivate fungus, as well as a complex network of tunnels consisting of a large, vertically oriented central chimney, surface conduits, and lateral connectives that connect the chimney and the surface conduits. In this study, we use computational modeling to explore the combined interaction of geometry, heterogeneous thermal mass, and porosity with the external turbulent wind and solar radiation to investigate the physical principles and fundamental aero-thermodynamics underlying the controlled and stable climate of termite mounds. Exploitation of natural resources of wind and solar energies in these natural systems for the purpose of ventilation will lead to new lessons for improving human habitats conditions.

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