Termite Biomimicry for Affordable, Eco-Friendly Homes

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The researchers were motivated to do research in this area because of the overheating crisis in India. Since one of the researcher's family is from Sri Lanka, and they're experiencing this same kind of danger, they wish to improve the quality of life in all low-income societies by creating eco-friendly, well air-conditioned houses that do not include any air-conditioners. In their first year, they chose an ideal house shape for heat-absorption, and last year, they chose an ideal siding material and roof shape, which was concluded to be mud bricks and shed roof, respectively. This year, they created vents inside of double-layered walls, which they called vent chambers, to control the temperature and act as an eco-friendly thermal control unit to maintain a comfortable temperature in the “inner chamber”. They started by creating a scaled model of the house design using cement boards and glued them together. Blue tape was used to places where changes in the interior design could be made. After constructing the model, adding the thermistors, and creating the vents and vent openers, they programmed each thermistor to record the proper temperature and programmed the servo motor and two stepper motors to open and close the vents at a certain temperature. They ran four different tests on the model itself to find the “trigger temperature” for the three thermistors associated with each vent. Finally, they added those temperatures to the code and ran tests to verify that the vents were opening and the temperature stabilized.

Awards Won:
Sigma Xi, The Scientific Research Honor Society: Third Physical Science Award of $500