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ASHRAE Grants: Reusing Air to Save Energy in Low-Income Housing

ATLANTA - Reducing energy costs through reuse of air to help make homes for low-income households in hot and humid climates is the goal of a student research project being funded by ASHRAE. Statistics show that some 38.6 million households in the United States are in need of low-income home energy assistance. In hot and humid climates, reducing residential energy consumption is a challenge due to high humidity in warm months.

Through ASHRAE's grants-in-aids program Simge Andolsun, a student at Texas A&M University, plans to model a new HVAC&R energy saving strategy with partial conditioning or reuse of air. Partial conditioning is based on using the remaining energy of the air returning from the occupied zones in unoccupied zones before it returns to the system or is exhausted from the system, according to Andolsun.

"The strategy is expected to provide substantial - over 50 percent - reduction in the overall HVAC&R energy consumption of residential buildings before any onsite energy reduction, according to the project, Partial Conditioning (Reuse of Air) as an Energy Saving Strategy for Sustainable Affordable Housing in Hot and Humid Climates.

Andolsun is one of 21 students who will receive a grant through ASHRAE Graduate Student Grant-In-Aid Award Program, which is designed to encourage students to continue their education in preparation for service in the HVAC&R industry. The grants, totaling $210,000, are awarded to full-time graduate students of ASHRAE-related technologies.

Andolsun's project will be modeling on Colonias, or residential neighborhoods at the Mexican border in Texas, which has the second highest number of housing units eligible for low-income home energy assistance. The state's hot and humid climate also results in 45 percent higher average energy consumption for air conditioning when compared to that for heating.

The study will be conducted in four steps: data collection, baseline design and modeling, partial conditioning design and modeling, and analysis and recommendations.

Other recipients of ASHRAE grants-in-aid are:

* Bikash Acharya, University of Maryland, College Park, Electrostatic Enhanced Separation of Fine Liquid Droplets from Gas Streams
* Aleksandar Andelkovic, Faculty of Technical Sciences Novi Sad, Serbia, Development of an Integrated Building Design Method by Coupling Building Energy Simulation and Computational Fluid Dynamics; also receives the Grant-In-Aid Life Member Club grant given to the highest top-rated applicants and supported by a financial contribution from the club.
* Simge Andolsun, Texas A&M University, Partial Conditioning (Reuse of Air) as an Energy Saving Strategy for Sustainable Affordable Housing in Hot and Humid Climates
* Stephen F. Bourne, University of Texas, Austin, Emissivity Changes due to Dust Fouling for Horizontal and Rafter Installed Radiant Barrier Systems
* Howard Cheung, Purdue University, Modeling and Testing of Heat Pump Systems
* Jordan D. Clark, University of Texas at Austin, Development of Library of Mass Transfer Correlations for Indoor Surfaces for Use in Passive Pollutant Removal Applications
* Brian Matthew Fronk, Georgia Institute of Technology, Condensation Heat Transfer and Pressure Drop of Binary Fluid Mixtures in Microchannels
* Caroline Hachem, Concordia University, Investigation of Design Methodology for Net-Zero-Energy Solar Neighborhoods
* Vibhash Chandra Jha, university of Maryland, Development of High Performance Compact Absorption Refrigeration Systems Utilizing Innovative Force-Fed Micro Channels - Application of Low-Grade Waste Heat
* Kyle Konis, University of California, Berkeley, Developing a Field-Based Monitoring Procedure for Indoor Environmental Quality to Assess Façade Performance
* Abhinav Krishna, Purdue University, Organic Rankine Cycle with Solution Circuit for Waste Heat Recovery
* Ki Sup Lee, Purdue University, Establishment of Design Procedures to Predict Room Airflow Requirements in Partially Mixed Room Air Distribution Systems
* Shichao Liu, University of Texas, Exposure Study in Hospital Waiting Rooms: Analysis of Airflow Distributions for Exposure Reduction
* Wei Liu, Tianjin University, Validation of CFD Models for Predicting Air Distribution and Contaminant Transport in a Commercial Aircraft Cabin
* Raphael Kahat Mandel, University of Maryland, Thin Film Evaporation on MIcrogrooved Surfaces
* Peter May-Ostendorp, University of Colorado at Boulder, Near-Optimal Control of Mixed-Mode Buildings and Generalized Rule Extraction
* Ananda Krishna Nagavarapu, Georgia Institute of Technology, Investigation of Binary Fluid Heat and Mass Transfer Phenomena at Microscales in Internal and External Ammonia Water Absorption; also receives the Grant-In-Aid Life Member Club grant given to the highest top-rated applicants and supported by a financial contribution from the club.

* Kashif Nawaz, University of Illinois at Urbana Champaign, Aerogel Coated Metal Foams for Desiccant Applications
* Amanda Pertzborn, University of Wisconsin-Madison, Optimization of Advanced Ground-Source Heat Pump Systems
* Sugirdhalakshmi Ramaraj, Purdue University
* Feini Zhang, University of Illinois at Urbana-Champaign, Hybrid Water-/Air-Cooled Condensers for Organic Rankine Cycles

ASHRAE, founded in 1894, is an international organization of some 50,000 persons. ASHRAE fulfills its mission of advancing heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education.

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