

# ACTIVE OR RECENTLY COMPLETED RESEARCH PROJECTS AND GRANTS BY REGION

WINTER/SPRING2017

IDENTIFIER	TC/TG	COST	RESEARCH TITLE OR SUBJECT	CONTRACTOR	NOTES
1327-RP	10.03	215,240	Flow Regime and Pressure Drop Determination for Two-phase Ammonia Upward Flow in Various Riser Sizes	DANISH TECHNOLOGICAL INST. - Aarhus, Denmark	Denmark
1414-RP	4.05	79,000	Update of U-factors, Solar Heat Gain Coefficients and Visible Transmittances of Standard Fenestration Units made from Representative Fenestration Frame and Glazing Systems in the Fenestration Chapter of the Handbook of Fundamentals	DESIGNBUILDER SOFTWARE, d.o.o (Ltd.), Beigrad, Serbia	Serbia
1634-RP	REF	454,494	Guide for Sustainable Refrigerated Facilities and Refrigeration Systems	MASSEY UNIV. - Palmerston North, New Zealand	New Zealand
<b>1767-RP</b>	1.01	49,000	Proposed Moist Air transport Properties Research	KRETZSCHMAR CONSULTING ENGINEERS - Zittau, Germany	<b>NEW</b> Germany
<b>CO-RP 2</b>	1.04 1.05, TG 2	25,000	Revised Guidance for Physical & Cyber HVAC Security - A CIBSE led project co-funded by ASHRAE	CIBSE - London, England	<b>NEW</b> England
<b>REGION RAL</b>		<b>822,734</b>			
1569-RP	10.03	100,000	CFD Study of Hydraulic Shock in Two-Phase Anhydrous Ammonia	ASCOMP USA - Cambridge, MA	
1631-RP	5.01	232,936	Countertop Commerical Appliance Emissions	SYRACUSE UNIV - Syracuse, NY	Completed Jan. 2017
<b>1755-RP</b>	9.09	247,792	Impact of Gaseous Contaminantion and High Humidity on the Reliable Operation of Information Technology Equipment in Data Centers	SYRACUSE UNIV - Syracuse, NY	<b>NEW</b>
<b>1807-RP</b>	MTG.Low GWP	80,000	Guidelines for Flammable Refrigerant Handling, Transporting, Storing and Equipment Servicing, Installation and Dismantling	NAVIGANT CONSULTING, INC. - Burlington, MA	<b>NEW</b>
GIA 15-16		10,000	Ventilated Semi-open Space for Thermal Comfort and Air Quality Control	SYRACUSE UNIV - Meng Kong	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Flame assisted fuel cell for micro combined heating and power (FFC micro-CHP) systems	SYRACUSE UNIV - Ryan Milcarek	Graduate Student Grant-in-Aid
<b>REGION I</b>		<b>680,728</b>			

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1447-RP	5.06	179,728	Performance of Pressurized Stairwells with Open Doors	NAT. RESEARCH COUNCIL CANADA - Ontario, Canada	Completed Sep. 2016
<b>1649-RP</b>	2.04	180,215	IAQ and Energy Implications of High Efficiency Filters in Residential Buildings	U-TORONTO - Ontario Canada	<b>NEW</b>
1696-RP	4.04	197,075	Thermal, Moisture and Air Transport Property Values for New Building and Insulating Materials	BUILDING SCIENCE CONSULTING, INC. Waterloo, Ontario, Canada	
GIA 15-16		10,000	Performance improvement of solar assisted heat pumps by integrating a ventilated/active thermal mass	RYERSON UNIV. - Navid Ekrami	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Integration of phase change materials into geothermal boreholes	ECOLE POLYTECHNIQUE DEMONTREAL- Laurent Gagne-Boisvert	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Development of a low cost particle analysis technique	U-TORONTO- Daniel Haaland	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Model-based control of convectively conditioned thermal zones for energy and load management	CONCORDIA U - Jennifer Date	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Development and Validation of a Novel Approach to Quantify the Impact of Human Exposure to Particle-Bound Contaminants in the Indoor Environment	U-TORONTO - Seyed Ghahfarrokhy	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Occupant modeling for prediction of comfort and building energy performance in office spaces	CARLETON U - Sara Gilani	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Advanced Integrated Energy Systems for High Performance Buildings	QUEEN'S U. of KINGSTON - Kristen Jaczko	Graduate Student Grant-in-Aid
<b>REGION II</b>		<b>627,018</b>			

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IDENTIFIER	TC/TG	COST	RESEARCH TITLE OR SUBJECT	CONTRACTOR	NOTES
1590-RP	7.08	125,000	Implementation of Total Cost of Ownership (TCO) Principles into Higher Education as an Integrated Decision Making Tool	APPA - Alexandria, VA	
1600-RP	5.06	60,097	Methods to Increase Maximum Velocity of Makeup Air for Atrium Smoke Control - CFD Study	U-MARYLAND - College Park, MD	Completed Feb. 2016
1717-RP	3.01	194,560	Improve Accuracy and Reproducibility of ASTM-E681 Test Method for Flammability Limit Measurement of 2L Flammable Refrigerants	U. OF MARYLAND - College Park, MD	
1738-RP	2.09	119,660	Field Measurements and Modeling of UVC Cooling Coil Irradiation for HVAC Energy Use Reduction	PENN. STATE UNIV. University Park, PA	
<b>1806-RP</b>	MTG.Low GWP	797,000	Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update	GEXCON US - Bethesda MD	<b>NEW</b>
<b>CO-RP 4</b>	3.01	25,000	Investigation of Ignition Temperature (Hot surface and Auto Ignition) for 2L Refrigerants	AHRTI - Arlington, VA	<b>NEW</b>
GIA 15-16		10,000	Campus energy model calibration for metering and retrofit measure prioritization	U-MARYLAND - Matthew Dahlhausen	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Impact of outdoor aerosol mass and composition indoor secondary organic aerosol (SOA) formation, and the impacts of using filters to control SOA formation	DREXEL UNIV- Chunyi Wang	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Impact of high ventilation rates and efficient filtration on indoor particle concentration and energy usage in an office building	DREXEL UNIV- Sheng Wang	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Evaluating energy consumption and indoor environmental quality in historic buildings	PENN. STATE U-Amanda Webb	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Use of additive manufacturing technique on development of next generation air to liquid heat exchangers	U-MARYLAND - Xiang Zhang	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Transport of Indoor Biological Dust	PENN. STATE U-Parichehr Salimifrad	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Airside heat transfer augmentation using multi-scale analysis and shape optimization for compact heat exchangers with small hydraulic diameters	U-MARYLAND - Daniel Bacellar	Graduate Student Grant-in-Aid
<b>REGION III</b>		<b>1,391,317</b>			
<b>1573-RP</b>	9.10	99,860	Determination of Suitable Replacement for SF6 when Used as a Tracer Gas in Accordance with ANSI/ASHRAE Standard 110	EXPOSURE CONTROL TECHNOLOGIES, INC. - Cary, NC	<b>NEW</b>
<b>1774-RP</b>	3.02	96,580	Effects of System Chemicals on the Breakdown of Lubricants and Lower GWP Refrigerants	SPAUSCHUS ASSOCIATES - Clyde, NC	<b>NEW</b>
<b>REGION IV</b>		<b>96,580</b>			

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IDENTIFIER	TC/TG	COST	RESEARCH TITLE OR SUBJECT	CONTRACTOR	NOTES
1262-RP	9.03	1,237,952	Relate Air Quality and Other Factors to Comfort and Health related Symptoms Reported by Passengers and Crew on Commercial Transport Aircraft (Part 2);	BATTELLE MEMORIAL INST. - Columbus, OH	
1604-RP	9.11	175,000	Demand Controlled Filtration for Clean Rooms	ENGSYSO - Ann Arbor, MI	
<b>1666-RP</b>	5.03	156,236	Experimental Evaluation of the Thermal and Ventilation Performance of Stratified Air Distribution Systems Coupled with Passive Chilled Beams	PURDUE UNIVERSITY - West Lafayette, IN	<b>NEW</b>
1724-RP	2.09	90,000	Study the HVAC System Photo-degradation Caused by the Low Level UVC Light Irradiance Used for Coil Maintenance and Air Stream Disinfection	U. OF DAYTON RESEARCH INST. College Park, OH	
GIA 15-16		10,000	Adsorption slurry heat pump with dry and liquid flooded compression	PURDUE - Nelson James	Graduate Student Grant-in-Aid
GIA 15-16		10,000	System identification and optimal control of intelligent high performance buildings with agent based approach	PURDUE - Jaewan Joe	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Human-centered design of building perimeter zones using visual and thermal comfort criteria	PURDUE - Iason Konstantzos	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Assessing effectiveness of HVAC configuration for preventing hospital acquired influenza transmission to health care	U. CINCINNATI - Deepthia Sharan Thatiparti	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Airborne virus inactiveness, phase I; using fluorescent bleaching of aerosols as a measure of exposure to oxidizing ions and radicals	U. MICHIGAN - Tian Xia	Graduate Student Grant-in-Aid
<b>REGION V</b>		<b>1,709,188</b>			

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IDENTIFIER	TC/TG	COST	RESEARCH TITLE OR SUBJECT	CONTRACTOR	NOTES
1196-RP	6.01	30,000	Development of Software to Calculate the Application Seasonal Efficiency of Commercial Space Heating Boiler Systems Based on ASHRAE Standard 155P	IOWA STATE UNIV. - Ames, IA	
1450-RP	SSPC 62.2	174,539	Transport of Contaminants from Garage Attached or Integral to Low-Rise Residential Buildings	U. ILLINOIS - Champaign, IL	
1507-RP	3.01	87,500	Binary Refrigerant Flame Boundary Concentrations	SAFETY CONSULTING ENGINEERS. INC. - Schaumburg, IL	
1602-RP	10.01	145,217	Thermal-Fluid Behavior of Mixed Refrigerants for Cryogenic Applications	U. WISCONSIN - Madison, WI	Completed Mar. 2016
1607-RP	6.09	142,461	Design and Utilization of Thermal Energy Storage to Increase the Ability of Power Systems to Support Renewable Energy Resources	U. WISCONSIN - Madison, WI	
1651-RP	MTG.ET	200,000	Development of Maximum Technically Achievable Energy Targets for Commercial Buildings (Ultra Low Energy Use Building Set)	GARD ANALYTICS, INC. - Park Ridge, IL	Completed Apr. 2016
1677-RP	8.05	169,699	Measurements and Prediction of Waterside Fouling Performance of Internally Enhanced Tubes in Cooling Tower Applications	U. ILLINOIS - Champaign, IL	
1681-RP	4.01	124,667	Low Energy LED Lighting Heat Gain Distribution in Buildings	IOWA STATE UNIV. - Ames, IA	Completed Nov. 2016
<b>1710-RP</b>	4.05	112,146	Effects of Dynamic Shading Devices on Daylighting and Energy Performance of Perimeter Zones	IOWA STATE UNIV. - Ames, IA	<b>NEW</b>
1712-RP	8.10	154,000	Development of the ASHRAE Design Guide for Dedicated Outdoor-Air Systems	SUSTAINABLE ENGINEERING. GROUP, LLC - Madison , WI	
<b>1719-RP</b>	6.09	83,900	Design Guide for Cool Thermal Storage - Update Revision	GARD ANALYTICS, INC. - Park Ridge, IL	<b>NEW</b>
<b>1721-RP</b>	8.11	120,714	Oil Return and Retention in Unitary Split System Gas Lines with HFC and HFO Refrigerants	PURDUE UNIV. - West Lafayette, IN	<b>NEW</b>
<b>1734-RP</b>	2.04	140,000	Reproducing a Representative Urban Atmospheric Aerosol Distribution at High Concentration in the Laboratory for Air Filter Ageing to be used in ASHRAE GPC 35P for Determining the Energy Consumption Caused by Air Filters	PURDUE UNIV. - West Lafayette, IN	<b>NEW</b>
<b>CO-RP 3</b>	9.06	38,600	Evidence Based Research Project: Literature Review for ASHRAE Standard 170-2013 - AN ASHE led project co-funded by ASHRAE	AMERICAN SOCIETY OF HEALTHCARE ENGINEERS (ASHE) - Chicago, IL	<b>NEW</b>
<b>Homer Addams 16-17</b>	2.04	5,000	Homer Addams Award for Graduate Student work on RP-1691 (Modeling the Impact of Residential HVAC Filtration on Indoor Particles of Outdoor Origin)	ILLINOIS INSTITUTE OF TECH. - Parham Azimi	<b>NEW</b>
GIA 15-16		10,000	Modeling the impact of mechanical ventilation and HVAC filtration compliance pathways in ASHRAE Standard 62.2 on fine and ultrafine particles inside residence	ILLINOIS INSTITUTE OF TECH. - Parham Azimi	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Characterizing the in-situ size resolved removal efficiency of residential and light commercial HVAC filters of particle sizes between 0.01 um and 10 um	ILLINOIS INSTITUTE OF TECH. - Torkan Fazli	Graduate Student Grant-in-Aid
GIA 15-16		10,000	Design and utilization of thermal energy storage to increase the ability of power systems to support renewable energy resources (ASHRAE 1607-TRP)	U. WISCONSIN - Amy Van Asselt	Graduate Student Grant-in-Aid
NIA 15-16		125,000	Evaluating the impacts of building enclosures and HVAC filtration on airborne particulate matter and energy efficiency in residential buildings	ILLINOIS INSTITUTE OF TECH. - Brent Stephens	New Investigator Award
GIA 16-17		10,000	Oil separation in compressors	U ILLINOIS - Jiu Xu	Graduate Student Grant-in-Aid

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<b>REGION VI</b>		<b>1,893,443</b>			

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IDENTIFIER	TC/TG	COST	RESEARCH TITLE OR SUBJECT	CONTRACTOR	NOTES
1284-RP	5.04	114,617	Develop a Standard for Testing and Stating the Efficiency of Industrial Pulse Cleaned Dust Collectors	BLUE HEAVEN TECH. - Louisville, KY	
1529-RP	2.06	102,900	Full-Frequency Numerical Modeling of Sound Transmission in and Radiation from Lined Ducts	SECAT, INC, Lexington, KY	Completed May. 2016
1587-RP	1.04	110,401	Control Loop Performance Assessment	UNIV. OF ALABAMA - Tuscaloosa, AL	Completed Sep. 2016
1674-RP	6.08	95,000	Research to Support the Revision to Ground Source Heat Pump: Design of Geothermal Systems for Commercial and Institutional Buildings (ASHRAE 1997)	ENERGY INFORMATION SERVICES - Northport, AL	Completed Jan. 2015
1747-RP	1.04	173,738	Implementation of RP-1547 CO2-based Demand Controlled Ventilation for Multiple Zone HVAC Systems in Direct Digital Control Systems	UNIV. OF ALABAMA - Tuscaloosa, AL	
GIA 16-17		10,000	Uncertainty Quantifications and Operation Optimization of Buildings as Virtual Batteries for the Grid with High Penetrations of Renewables	UNIV. OF ALABAMA - Fuxin Niu	Graduate Student Grant-in-Aid
<b>REGION VII</b>		<b>606,656</b>			

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IDENTIFIER	TC/TG	COST	RESEARCH TITLE OR SUBJECT	CONTRACTOR	NOTES
1385-RP	6.08	193,132	Development of Design Tools for Surface Water Heat Pump Systems (SWHP)	OKLAHOMA STATE UNIV. - Stillwater, OK	
1399-RP	9.11	237,346	Survey of Particle Production Rates from Process Activities in Pharmaceutical and Biological Cleanrooms	U. OF OKLAHOMA	
1546-RP	5.03	137,757	Expansion and Updating of the Air Diffusion Performance Index Method	UNIV. TEXAS - Austin, TX	Completed Mar. 2016
1564-RP	8.04	199,975	Measurement of Oil Retention in the Microchannel Heat Exchanger	UNIV. TEXAS - Austin, TX	Completed Jan. 2016
1608-RP	8.11	128,302	Development of Load-based Method of Test for Light Commercial Unitary HVAC	OKLAHOMA STATE UNIV. - Stillwater, OK	Completed Sep. 2016
1645-RP	8.04	179,254	Development of New Accelerated Corrosion Test(s) for All-Aluminum Microchannel and Tube and Fin Heat Exchangers	U. NORTH TEXAS - Denton, TX	
1729-RP	4.01	182,841	Experimental Verification of Cooling Load Calculations for Spaces with Non-Uniform Temperature Radiant Surfaces	U. TEXAS-Austin	<b>NEW</b>
1742-RP	4.01	64,998	Update to Measurements of Office Equipment Heat Gain Data	OKLAHOMA STATE UNIV. - Stillwater, OK	<b>NEW</b>
1743-RP	8.11	89,000	Effect of Inlet Duct and Damper Design on ASHRAE 37/116 Fan Performance and Static Pressure Measurements	OKLAHOMA STATE UNIV. - Stillwater, OK	<b>NEW</b>
1785-RP	8.11	139,615	Experimental Validation of Refrigerant Charge Models in Coils for Residential Split Systems	OKLAHOMA STATE UNIV. - Stillwater, OK	<b>NEW</b>
GIA 15-16		10,000	Investigation of system wide methodologies for minimizing building electricity demand and cost	U. OF OKLAHOMA - Oluwaseyi Tope Ogunsola	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Characterization of Air Mixing with Different HVAC Systems and Assessment of Potential for Airborne Infectious	U. TEXAS - Leigh Lesnick	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Quantifying the energy savings benefits of smart meters and home automation for single family residences	TEXAS A&M - Sukjoon Oh	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Evaluation of HVAC Filters as a Sampling Mechanism for SVOC pollutants in U.S. Schools Motivation	U. TEXAS - Hongwan Li	Graduate Student Grant-in-Aid
<b>REGION VIII</b>		<b>1,592,220</b>			



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1462-RP	8.03	143,168	Active Mechanism for Enhancing Heat and Mass Transfer in Sorption Fluids	U. NEBRASKA - Lincoln, NE	Completed Jan. 2016
1467-RP	10.07	167,425	Balancing Latent Heat Load between Display Cases and Store Comfort Cooling	U. COLORADO - Boulder, CO	Completed Feb. 2016
1556-RP	1.03	177,067	Characterization of Liquid Refrigerant Flow Emerging from a Flooded Evaporator Tube Bundle	KANSAS STATE U. - Manhattan, KS	
1615-RP	7.05	82,272	Fault Detection and Diagnostics (FDD) Methods for Supermarkets - Phase I	U. NEBRASKA - Lincoln, NE	
1627-RP	2.08	129,968	An Evaluation of the Actual Energy Performance of Small Office and K-12 School Buildings Designed in Accordance with the 30% ASHRAE Advanced Energy Design Guides	GROUP 14 ENGINEERING - Denver, CO	Completed Nov. 2016
1629-RP	5.03	140,259	Testing and Modeling Energy Performance of Active Chilled Beam Systems	U. COLORADO - Boulder, CO	
1630-RP	5.11	54,210	Update the Scientific Evidence for Specifying Lower Limit Relative Humidity Levels for	KANSAS STATE U. - Manhattan, KS	Completed Jun. 2016
1635-RP	4.03	70,000	Simplified Procedure for Calculating Exhaust/Intake Separation Distances	CPP, INC. - Fort Collins, CO	Completed Mar. 2016
1650-RP	7.03	56,300	Training Requirements for Sustainable High Performance Building Operations	MONTANA STATE UNIV. - Bozeman, MT	<b>NEW</b>
1702-RP	7.06	160,071	Case Studies to Test Performance Measurement Protocols	UNIVERSITY OF WYOMING - Laramie, WY	
1705-RP	8.04	134,962	Investigation of Airside Fouling on Outdoor Heat Exchangers	U. NEBRASKA - Lincoln, NE	
GIA 16-17		10,000	Campus Energy Modeling Tool for Incorporating Mixed Thermal Energy Storage in University and Urban Commercial spaces	COLORADO SCHOOL OF MINES - Sajith Wijesuriya	Graduate Student Grant-in-Aid
NIA 16-17	7.05	125,000	Compile a library of simulation data that can be used to develop next-generation automated fault detection and diagnosis (AFDD) algorithms, and to evaluate their performance. Develop cost-effective fault-robust air-conditioning systems. Develop near-optimal control of variable-speed air-cooled air-conditioning systems	U. NEBRASKA - David Yuill	New Investigator Award
<b>REGION IX</b>		<b>1,450,702</b>			

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1408-RP	2.06	149,839	The Effect of Lining Length on the Insertion Loss of Acoustical Duct Liner in Sheet Metal Ductwork	U. NEVADA- Las Vegas, NV	
1455-RP	1.04	160,000	Advanced Control Sequences for HVAC Systems - Phase I Air Distribution and Terminal Systems	TAYLOR ENGINEERING - Alameda, CA	Completed Jan. 2017
1588-RP	4.07	75,000	Representative Layer-by-Layer Descriptions for Fenestration Systems with Specified Bulk Properties such as U-factor and SHGC	WHITE BOX TECHNOLOGIES, INC. - Moraga, CA	
1665-RP	3.02	103,685	R-40 Stability with HVAC&R System Materials	McCAMPBELL ANALYTICAL, INC. - Pittsburgh, CA	Completed Jan. 2016
1682-RP	5.02	117,719	Study to Identify CFD Models for Use in Determining HVAC Duct Fitting Loss Coefficients	EMBRY-RIDDLE AERONAUTICAL UNIVERSITY - Prescott, AZ	Completed Jan. 2017
GIA 15-16		10,000	Grey box building models for onlin eadvanced control (MPC) of HVAC systems	UC-Davis - Marco Pritoni	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Thermal comfort database for commercial and residential buildings	UC-Berkeley- Veronika Foldvary	Graduate Student Grant-in-Aid
<b>REGION X</b>		<b>626,243</b>			
GIA 15-16		10,000	Design and heat moisture transfer performance of 3-fluid liquid-to-air membrane energy exchanger for energy recovery applications and solar air conditioning systems	U-SASKATCHEWAN - Mohamed Abdel-Salam	Graduate Student Grant-in-Aid
GIA 16-17		10,000	The Effect of Humidity, Temperature, and Particle Fouling on Permeation Properties of Polymer Membranes	U of BRITISH COLUMBIA - Amin Engarnevis	Graduate Student Grant-in-Aid
GIA 16-17		10,000	Experimental validation of models for heat and mass performance evaluation of membrance based energy recovery devices	OREGON STATE UNIVERSITY - Paul Armatis	Graduate Student Grant-in-Aid
<b>REGION XI</b>		<b>30,000</b>			

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1535-RP	8.04	165,979	A Heat Transfer and Friction Factor Correlation for Low Air-Side Reynolds Number Applications of Compact Heat Exchangers	FLORIDA INTERNATIONAL UNIV. - Miami, FL	Completed Mar. 2016
1675-RP	4.10	136,792	Guidance for CFD Modeling of Data Centers	FLORIDA INTERNATIONAL UNIV. - Miami, FL	<b>NEW</b>
1771-RP	bEQ	199,395	Energy Modeling of Typical Commercial Buildings in Support of ASHRAE Building Energy Quotient Energy Rating Program	UNIVERSITY OF MIAMI - Miami, FL	<b>NEW</b>
GIA 15-16		10,000	Toward a Fast modling real time simulation, and HVAC control strategies in data centers	FLORIDA INTERNATIONAL UNIV. - Long Phan	Graduate Student Grant-in-Aid
<b>REGION XII</b>		<b>512,166</b>			
GIA 15-16		10,000	The Modelling Study of Population Multi-pathway Exposure to Multi-phase Semi-volatile Organic Compounds (SVOCs)	TSINGHUA UNIV. - Shanshan Shi	CHINA GIA
GIA 16-17		10,000	Effectivenessof Ultraviolet Germicidal Irradiation (UVGI) Systems in Air Handling Units in Enhancing IAQ and Energy Performance	NATIONAL U OF SINGAPORE - Wang Yi	SINGAPORE GIA
GIA 16-17		10,000	Humans as Sources or Sinks of Volatile Organic Compounds in Built Environment: Measurements and Implications to Indoor Air Quality Assessment	TSINGHUA UNIV. - Xiao Sun	CHINA GIA
<b>REGION XIII</b>		<b>30,000</b>			
<b>GRAND TOTAL</b>		<b>12,068,995</b>			