

January Member Meeting

Update on Refrigerants: Past, Present and Future

Tuesday, January 19, 2016

In recent decades, the refrigeration and air conditioning sciences have been in a state of flux primarily because of the phase-out of ozone-depleting CFC and HCFC refrigerants, and secondarily because of environmental concerns related to the direct global warming impacts of some of the replacement refrigerants. Due to these concerns, there is significant worldwide interest in using substances that are naturally occurring in the biosphere as refrigerants, which are considered benign to the environment and are termed "natural working fluids". Surprisingly, many of these substances were already used as refrigerants at the dawn of the refrigeration technology in the late 1800's. Thus, when looking at the refrigerants of the future, it is essential to understand which substances have been used in past.

This presentation provides a detailed review of the past and present refrigerants, and proposes refrigerants and their respective technologies that could be used in the future. An assessment of their characteristics related to choice of one versus another, and an identification of trends set by these choices will be made.

[Register online at newmexicoashrae.org](http://newmexicoashrae.org)

Date: 01/19/16
Location: Pappadeaux Seafood Kitchen
5011 Pan American Fwy NE
Albuquerque, NM 87109
Social hour: 11:30 am – noon
Presentation: noon – 1 pm
Cost: \$25 (Members)
\$30 (Guests)

About the Speaker

Dr. Eckhard A. Groll is the Reilly Professor of Mechanical Engineering and the Director of the Office of Professional Practice at Purdue University. He joined Purdue University as an Assistant Professor in 1994, was promoted to Associate Professor in 2000, to Full Professor in 2005 and to the Reilly Professorship in 2013. He received his Diploma in Mechanical Engineering from the University of the Ruhr in Bochum, Germany, in 1989 and a Doctorate in Mechanical Engineering from the University of Hannover, Germany, in 1994.

Professor Groll teaches Thermodynamics and his research focuses on the fundamental thermal sciences as applied to advanced HVAC&R systems, components, and their working fluids. Since joining Purdue, he has been the principal investigator (PI) or Co-PI on more than 100 research grants and 46 educational grants with a total budget of approximately \$10.5 million. He has authored or co-authored 105 archival journal articles and 180 conference papers. He has been the co-author of 3 book chapters and the editor or co-editor of 7 conference proceedings. He holds 4 patents. He has given 73 invited lectures/invited seminars and 11 keynote lectures. He serves as the Regional Editor for the Americas for the International Journal of Refrigeration (IJR) and is a Fellow of ASHRAE.

Dr. Groll has been recognized for his academic leadership in higher education. He is a 2010-2011 Fellow of the American Council on Education (ACE) and participated in the Academic Leadership Program of the Committee on Institutional Collaboration (CIC-ALP) during 2009-2010. He has received numerous awards for his research and teaching excellence including the 2010 E. K. Campbell Award from ASHRAE, his induction into the Book of Great Teachers at Purdue University in 2008, and the 2007 Purdue University Faculty Scholar Award.

Upcoming Events

- Jan 19, 2016** **General Meeting**
Distinguished Lecturer: Update on Refrigerants: Past, Present, and Future
11:30am – 1pm at Pappadeaux Seafood
- Feb 2016** **Joint Meeting with AEE**
Lessons Learned in Solar Hot Water
Location: TBA
- March 2016** **General Meeting**
Distinguished Lecturer
Air Conditioning: A Look Into the Past & a Guess into the Future
11:30am – 1pm at Pappadeaux Seafood
- April 2016** **General Meeting**
Computer Room Air Conditioning
11:30am – 1pm at Pappadeaux Seafood
- May 2016** **Awards Meeting**
5:30pm – 7pm at Pappadeaux Seafood
- Sept 9, 2016** **Annual Golf Tournament**
at UNM Championship Golf Course

Seeking Volunteers & Leaders

We are seeking individuals within the HVACR industry to join the leadership team of the New Mexico chapter. You can become more involved in a variety of positions which **only requires a 1 year commitment**. It's a great chance to try it out.

Further your career, build your network of professionals, strengthen your leadership skills and implement new ideas within our professional community by volunteering as a Board of Governor.

Contact any of the current Board members to find out more.

Student Activities

We have reached out to the San Antonito Elementary School to volunteer to judge the annual science fair. The event is **Thursday, February 4th from 8:30am to 12:30pm**. The school will offer breakfast for judges (it was breakfast burritos last year) starting at 8:00am. They pair judges in teams according (roughly) to area of expertise. Judges can examine student posters and projects before 9:00 a.m. Judges are responsible for a group of about 7-10 students. We provide judges with judging rubrics for each project (including a point system and space for comments). Around 8:45 a.m., we give a brief introduction about the process and about what kinds of questions judges may want to ask. Beginning at 9:00 a.m., judges interview students about their projects one by one. At noon, the interview period concludes and judges meet to decide on first, second, and third place winners in individual science categories and age groups. The judging categories are as follows:

- Kindergarten, 1st and 2nd grade participants (no separation by category and no competition)
- Behavioral Science – 3rd and 4th grade/ 5th grade
- Animal Science – 3rd and 4th grade/ 5th grade
- Psychology – 3rd and 4th grade/ 5th grade
- Botany – 3rd and 4th grade/ 5th grade
- Earth Science – 3rd and 4th grade/ 5th grade
- Food Science – 3rd and 4th grade/ 5th grade
- Chemistry – 3rd and 4th grade/ 5th grade
- Engineering – 3rd and 4th grade/ 5th grade
- Physics – 3rd and 4th grade/ 5th grade
- Biology – 3rd and 4th grade/ 5th grade

Our judges in the past have praised the high quality of projects and have enjoyed talking to San Antonito children. You may want to look at the San Antonito Elementary School website Science Fair page to glance at judging rubrics:

<http://saes-aps-nm.schoolloop.com/sciencefair>.

This is a great opportunity to work with the community. I was able to judge some last year and I was blown away by well the experiments were put together and presented by the students.

If you are able please reach out to me at ryan.shaffer@jci.com to participate. Thank you.

From the History Books



Jan 1995



President:	Harold Trujillo
President-Elect:	Steve Willard
Secretary:	Don Schedlbauer
Treasurer:	Ed Reyes

The program featured Mr. Mark Domzalski of CRS Sistine Engineers spoke about the many challenges and benefits to designing "State of the Art" Micro-chip fabrication plants from a real world prospective. Mr. Domzalski spoke at both the Santa Fe luncheon meeting and the Albuquerque dinner meeting.

As a part of the centennial celebration of ASHRAE, ASHRAE will present a special Die Cast Commemorative Centennial Medallion for contributions of \$100.00 or more.

Research Promotion Update

The Research Promotion Campaign annually raises funds to support ASHRAE's research program. It is conducted by the Society's membership through local chapter volunteers and **receives over 7,000 contributions** each year from the membership and companies associated with the HVAC&R industry.

/ 2015-2016 NM Chapter RP Progress /

Goal: \$8,300.00
Collected: \$1,728.00



21%

This year ASHRAE-NM has set a goal of **\$8,300.00**. We have currently raised \$1,528 towards our goal! 100% of funds go directly into the research program to develop and advance our industry.

To learn more about how you can make a difference, go to: <https://newmexicoashrae.org/research-promotions>



Shaping Tomorrow's
Built Environment Today

Grassroots Government Advocacy Committee

Upcoming APS and CNM School Bond Special Election

A special election for Albuquerque Public Schools (APS) and Central New Mexico Community College (CNM) will be held on **Tuesday, Feb. 2, 2016**.

All registered voters within the Albuquerque Public Schools District boundaries, including Bernalillo County and The Village of Corrales in Sandoval County are eligible to vote.

School Mill Levy Ballot Question:

“Shall the Albuquerque Public School District continue to impose a property tax of \$3.838 for residential property and \$4.344 for non-residential property per each \$1,000.00 of net taxable value of property allocated to the Albuquerque Public School District for the property tax years 2016, 2017, 2018, 2019, 2020 and 2021 for the purpose of (1) erecting, remodeling, making additions to, providing equipment for or furnishing public school buildings; (2) payments made pursuant to a financing agreement for the leasing of a building or other real property with an option to purchase for a price that is reduced according to payments made; (3) purchasing or improving public school grounds; (4) administering the projects undertaken pursuant to sections 1 and 3 above, including expenditures for facility maintenance software, project management software, project oversight and district personnel specifically related to administration of projects funded by the Public School Buildings Act provided that expenditures pursuant to this section shall not exceed five percent of the total project cost?”

School Bond Ballot Question:

“Shall the Albuquerque Public School District issue **\$200,000,000** of general obligation bonds to erect, remodel, make additions to and furnish school buildings within the district, to purchase or improve school grounds, to purchase computer software and hardware for student use in public schools, and to provide matching funds for capital outlay projects funded pursuant to the Public School Capital Outlay Act?”

Election Info

Voting Convenience Centers will be utilized for this election. There will be a total of 30 Election Day sites and five early voting sites. If you are an eligible voter for this election, regardless of which county (Bernalillo/Sandoval) in which you are registered, you will be able to cast a ballot at any of the Voting Convenience Centers.

Dates:

Jan. 5: Last day to register to vote.

Jan. 5: Absentee voting begins. Absentee ballots will continue to be mailed through Friday, Jan. 29 for individuals who have filled out a properly completed application.

Jan. 8: Absentee in person only at the Voting Machine Warehouse. This will take place daily Monday through Friday 8 a.m. to 5 p.m. until Friday, Jan. 29.

Jan. 13: Early Voting begins. This will take place daily Tuesday through Friday from 7 a.m. to 5 p.m. and on Saturdays from 8 a.m. to 2 p.m. until Saturday, Jan. 30.

Sources: <http://www.bernco.gov/clerk/current-and-upcoming-election-information.aspx>
<http://www.growingmyworld.org/the-election/>

2015 – 2016 Board of Governors

Past President	David Graham (<i>T&D Services</i>) <i>T&D Services</i>	DGraham@t-d-services.com
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Golf Tournament	Allen Anaya <i>Varitec Solutions</i>	allena@varitecsolutions.com
Membership Chair	<i>Interested in this position? Contact Joe Higham!</i>	

Check out our website to find out more about the Board, committees, and our initiatives. Contact Joe Higham if you are interested in becoming more involved in our chapter. There are plenty of opportunities!



2016 ASHRAE Winter Conference

Jan. 23–27 | Orlando Hilton | Orlando, Fla.

*New Technical Program Tracks, Networking,
World's Largest HVAC&R Marketplace*

Special first time attendee registration fee available! Low, early-bird registration rates end Nov. 2. Register early! Registration to the ASHRAE Winter Conference includes free access to the AHR Expo!



2016 AHR Expo

Jan. 25–27 | Orange Co.
Conv. Center | Orlando, Fla.

Venues are strategically located next to each other for easy access.



Society News

1791 Tullie Cir. NE | Atlanta, Ga. 30329-2305 | 404-636-8400 | www.ashrae.org

Would you like to see an app from ASHRAE?

ASHRAE is conducting a survey on what types of apps we could develop to help keep you informed, make your day-to-day job easier, or make accessing ASHRAE resources easier. We'd love to hear from you about what features would be useful for you in a future ASHRAE app. The survey should only take 5 minutes, and your responses are completely anonymous.

[Please take the survey](#) before January 15, 2016.

You can only take the survey once, but you can edit your responses until the survey is closed on January 15, 2016. Questions marked with an asterisk (*) are required.

If you have any questions about the survey, please email us: youngengineers@ashrae.org. We really appreciate your input!

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YEA Connection

Spring 2016 YEA Leadership Weekend

Registration is now open for the Spring 2016 YEA Leadership Weekend! The event is scheduled for February 19-21, 2016 in Austin, Texas. There are only 30 registration spots available, so be sure to sign up soon! You can register and learn more at www.ashrae.org/YLW.

YEA Technical Weekend

The inaugural YEA Technical Weekend was a hit! Participants attended professional development courses, explored on technical tours, and networked with YEA members from around the country. Information on any upcoming YTW events will be posted at www.ashrae.org/YTW.

Earmark your RP Contributions for YEA

Remember that you can now direct your traditional RP Campaign support directly to the YEA Programs! Not only will your Chapter receive RP credit for your donation and you receive all the recognition entitled to RP Campaign donors, you will also be able to directly benefit and support YEA programs. To donate, use the [online gift form](#) and select the "YEA" option.

HVAC Design Essentials Scholarship

Interested in attending the HVAC Design Essentials Training? Be sure to apply for a scholarship! YEA offers one scholarship to every scheduled training. [Find a date that works for you and apply!](#)

2016 Winter Conference in Orlando

We hope to see you at the ASHRAE Winter Conference next month! The event is scheduled for January 23-27, 2016 in Orlando, FL. Be sure to visit the YEA Hospitality Suite on Sunday, January 24 from 4-6pm, and the YEA/Student Mixer on Saturday, January 23 from 5-6:30pm.

Leadership U – Orlando

Congratulations to the four members selected as Leadership U participants for the 2016 Winter Conference in Orlando! Be sure to check www.ashrae.org/leadershipu for updates on applying for future conferences!

- Chonghui Liu, Central New York Chapter
- Jessica Errett, Nebraska Chapter
- Manalee Nabar, New York Chapter
- Cris Washburn, Mississippi Valley Chapter

ASHRAExCHANGE

Want to stay updated with ASHRAE instantly? Log onto to ASHRAExCHANGE to ask questions, discuss industry news and connect with other young engineers!

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U.S. House of Representatives Misses Opportunity to Support Energy Efficiency

Dec 4, 2015

Contact: Jodi Scott
Public Relations
678-539-1140
jscott@ashrae.org

ATLANTA – This week, the U.S. House of Representatives had the chance to stand with the private sector, professional and nonprofit stakeholder organizations to reaffirm its strong commitment to support the development, adoption and implementation of private sector-led, consensus-based model building energy codes. Instead, the House chose to pass the North American Energy Security and Infrastructure Act of 2015 (H.R. 8), which includes language that threatens to reduce understanding of the potential full impacts of the model building energy codes by likely limiting the technical assistance that the U.S. Department of Energy currently provides, upon request, to ASHRAE, the International Code Council, States and Indian tribes for the development, adoption and implementation of these model codes.

“While ASHRAE is disappointed with the passage of this language, we applaud the efforts of Representative Peter Welch (D-VT-At Large) in seeking an amendment to H.R. 8 that would have replaced the harmful building energy codes language with language from the bipartisan Energy Savings and Industrial Competitiveness Act of 2015 (H.R. 2177),” ASHRAE President David Underwood said.

Previously introduced by Representatives Welch and David McKinley (R-WV-1), H.R. 2177, is widely supported and has been carefully negotiated over a number of years, embodying the collective wisdom of many.

“ASHRAE remains hopeful that Congress will ultimately demonstrate its support for market-driven energy efficiency by enacting legislation that protects the development, adoption and implementation of private sector-led, consensus-based model building energy codes,” added Underwood.

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Innovative Buildings Recognized by ASHRAE with Technology Awards

Jan 5, 2016

Contact: Jodi Scott
Public Relations
678-539-1140
jscott@ashrae.org

ATLANTA – Wind turbines, subcooled glycol/water, geothermal wells, reuse of coil condensation water and a central heat pump water heating system are among the innovative measures used in the five buildings receiving ASHRAE Technology Awards.

The awards recognize outstanding achievements by members who have successfully applied innovative building design. Their designs incorporate ASHRAE standards for effective energy management and indoor air quality. Winning projects are selected from entries earning regional awards.

First place awards will be presented at the ASHRAE 2016 Winter Conference, Jan. 23-27, Orlando, Fla.

Following are summaries of the winning projects:

Walgreens Net Zero Store

Benjamin A. Skelton, P.E., BEMP, president, Cyclone Energy Group, Chicago, Ill., receives first place in the new commercial buildings category for the Walgreens Net Zero Store, Evanston, Ill. The building is owned by Walgreen Co.

The global retail pharmacy brand set out with a vision to create a scalable retail building design that would serve as a showcase for innovative, sustainable and high performance design to sustainability, architecture, engineering and retail communities. The store is designed to achieve net zero energy use by the National Renewable Energy Laboratory's most stringent definition of "renewable energy generated within the building footprint."

Among its innovative features are:

- 840 roof-mounted solar panels, generating enough energy to power 30 Illinois homes for a year
- two 35-foot-tall wind turbines, using winds from Lake Michigan to generate enough power to offset annual greenhouse gas emissions from 2.2 passenger vehicles
- geo-exchange energy obtained by drilling 550 feet into the ground below the store
- LED lighting and daylight harvesting
- carbon dioxide refrigerant for heating, cooling and refrigeration equipment
- energy efficient building materials

The owner set out with a vision to create a store that would be an innovation laboratory to test products, materials, systems and equipment that could be incorporated into prototype designs and retrofit throughout existing stores. Walgreens also wanted to share the results from the design, construction and ongoing operation of the store with the public, design community and even their competition. The store is designed to facilitate tours, including hosting executives and designers from their retail competition.

DPR Construction's San Francisco Net Positive Energy Office

Dylan T. Connelly, associate, Integral Group, Oakland, Calif., receives first place in the existing commercial buildings

category for DPR Construction's San Francisco Net Positive Energy Office. DPR Construction occupies the building and has a 10 year lease with an option for 10 more years.

A national construction company, DPR sought to lead by example and transform the building industry with its retrofitted net positive 22,000 square foot San Francisco office. The office demonstrates the potential of the capabilities of integrated, innovated and replicable design, reducing energy use and improving indoor environmental conditions while being cost effective with today's technologies. The design includes a 118 kw rooftop photovoltaic system, all electric systems, operable skylights, building management system controlled ceiling fans, enhanced daylighting and living walls.

A net positive energy office building was achieved by reducing energy loads through use of efficient HVAC and electrical systems, and by installing photovoltaic and solar thermal systems on the roof to produce more energy than the building consumes. The target energy use index (EUI) was 23.6 kBtu/square foot/year and achieved a first year EU of 20.4, significantly lower than the code baseline of 49 EUI and 20 percent net positive energy. By retrofitting an existing building vs. building new, the project reduced its initial carbon footprint by over 70 percent.

Occupant comfort and health is also a top priority. A dedicated outdoor air system delivers 30 percent more ventilation than required ANSI/ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*. Heat recovery ventilators use MERV 8 pre-filters and MERV 13 final filters to filter out contaminants, increasing the efficiency of filtration and continuing to improve indoor air quality.

Another interesting feature is the use of dynamic elements, such as sunlight and plants, to activate the space, engage users and provide a connection of surroundings. Three living walls in the main lobby improve indoor air quality by absorbing volatile organic compounds while also increasing the overall wellbeing for occupants.

Anne-Marie Edward Science Building – John Abbott College

Nicolas Lemire, Ing., HFDP, president/principal, Pageau Morel and Associates, Montreal, Quebec, receives first place in the new educational facilities category for the Anne-Marie Edward Science Building at John Abbott College, Sainte- Anne-De-Bellevue, Quebec. The building is owned by the college.

The contemporary six-story facility is named after a victim of a 1989 shooting at Ecole Polytechnique who was a science graduate of John Abbott. Anne-Marie Edward had been pursuing an engineering degree, and the community felt that through engineering, the pavilion demonstrated how humans are essential to environmental sustainability using applied knowledge and technology.

Energy diversification is accomplished with the use of geothermal wells, electrical heating and cooling, natural gas hot water heating and solar preheating. Potable water consumption is reduced with the use of low flow plumbing fixtures and resources are maximized through reuse and recuperation:

- reuse of return air as compensation air in laboratories
- reuse of coil condensation water to humidify exhaust air
- recuperation on both general and laboratory exhausts
- recuperation through heat pump extraction and storage in stratified tanks
- recuperation of rainwater and fan-coil condensation water.

Laboratory ventilation requirements and large glazing surfaces can have devastating effects on energy efficiency. Nonetheless, the building's actual energy use is 45 percent lower than the baseline case and 10 percent lower than the proposed simulation.

Seattle-Tacoma (Sea-Tac) Airport Pre-Conditioned Air

Ken Warren, P.E., capital project manager, Port of Seattle (Wash.), receives first place in the new industrial facilities or processes category for the Sea-Tac Airport Pre-Conditioned Air project. The building is owned by the Port of Seattle.

The Port's Century Agenda sets a vision of reducing carbon emissions and air pollutants, increasing energy conservation, being socially and fiscally responsible and exceeding customer expectations. Its Pre-conditioned Air project is an important step in meeting an agenda objective of being the greenest, most energy efficient port in North America.

The system includes a pre-conditioned air plant (PCAP), piping and air handlers to provide cooling and heating for airplanes during boarding and deplaning to reduce costs for airlines, improved air quality, reduced noise and increased energy efficiency. The PCAP delivers sub-cooled glycol/water through 15 miles of piping to each of the 73 airplane gates in the existing facility, to serve the complete airplane HVAC&R needs. The system allows airplanes to shut off their jet-fueled on-board auxiliary power units (APUs), resulting in jet fuel savings and reductions in carbon dioxide and other gas emissions.

The reductions realized through the project include annual savings of:

- An estimated five million gallons in fuel; a \$15 million savings in airline fuel costs
- 40,000 metric tons of greenhouse gases, the equivalent of removing 8,000 cars from the road
- 73 tons of nitrogen oxides
- Noise pollution from aircraft parked at the gates operating their APUs

Stack House Apartments

Jonathan M. Heller, P.E., principal engineer, Ecotope Inc., Seattle, Wash., receives first place in the residential category for the Stack House Apartments. The building is owned by Stack House Acquisition LLC.

The project includes two new multifamily buildings and one adaptive reuse of a historic building, which helped to retain some of the historical character of the neighborhood. The project covers an entire city block in the South Lake Union neighborhood of Seattle.

Innovative mechanical systems include a central heat pump water heating system in the largest of the two multifamily buildings, ductless heat pumps for 40 percent of the apartment units and common spaces, and rainwater catchment and reuse for urban agriculture on the roof. The historic building was included in the City of Seattle's pilot of an outcome-based energy code; the first program in the nation to predicate energy code compliance on post-occupancy proof of highly efficient operations. The project also participated in a stormwater treatment pilot project with Seattle Public Utilities with two biofiltration swales providing primary treatment to stormwater run-off from the Capitol Hill neighborhood before discharging to Lake Union.

The apartments are among the most energy efficient in the Pacific Northwest with measured EUIs of 19.8 kBtu/square foot/year for the West Building and 27.1 kBtu/square foot/year for the Southeast Building. ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The Society and its more than 54,000 members worldwide focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability. Through research, standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today. More information can be found at www.ashrae.org/news.

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