



Rocky Mountain Chapter

23rd Annual Technical Conference:

People, Passion and Performance

Friday April 24th, 2015

Register and Pay at www.rockymtnashrae.com
Sheraton Denver West Hotel
360 Union Boulevard
Lakewood, CO 80228

Co-Sponsored by Rocky Mountain



GBCI Continuing Education Hours
provided by USGBC Colorado



COLORADO

This year's Technical Conference theme is "People, Passion, and Performance...". Our Keynote Speaker James Vallort, ASHRAE Society Vice President, will be speaking on "Achieving a Green Data Center: More than a Good Design Is Needed". Mr. Vallort currently serves as a member of Standard Project Committee 211P, Standard for Commercial Building Energy Audits, and Technical Committee (TC) 7.9, Building Commissioning. He also served as chair of the CIBSE/ASHRAE 2000 Joint Conference Steering Committee, the Member Council ad hoc committee on young engineers and the Society Program Committee and vice chair of the CIBSE/ASHRAE 2003 Joint Conference steering committee. He was president of the Illinois Chapter in 1999-2000. Vallort is the recipient of an Exceptional Service Award, a Distinguished Service Award and an Excellence in Engineering Award from the Illinois Chapter in 1998.

This year's conference will include the Fundamentals Track, Systems and Applications Track, the Sustainability Track, the Building Automation Track, and a Critical Environment Track. There will be a broad range of information to entertain both experienced and novice engineers.

This is the 23rd annual ASHRAE Rocky Mountain Chapter Technical Conference. The chapter prides itself on providing quality speakers and presentations to the HVAC&R community. We will be providing PDHs and CEUs as usual, as well as GBCI credits for 15 of the 27 sessions.

Thank-you:

This event has been ongoing for close to 25 years thanks to the efforts of many dedicated individuals that contribute their time by serving on the conference committee. The Rocky Mountain Chapter would therefore like to express its gratitude to these individuals and their respective companies.

Technical Conference Committee:

Tony Anderson – AMI Mechanical
Greg Bradshaw- Bradshaw Building Solutions
Trevor Bromberg – McGrath
Nico D'Alessandro - Siemens
Sara Frame – Dewberry
Mike Fulton - Western Mechanical Solutions
Larry Gelin – CFM Company
Ira Goldschmidt – Goldschmidt Engineering
Mike Harrington – Beabout Brock Easley, Chair

Jessie Jones-Fleming – RMH Group
Brian Lynch – Western Mechanical Solutions
Bill Mele – Chemistry & Industrial Hygiene
Ken Nekvasil – ATS Rocky Mountain
Jon Rundquist – Air Purification Company
Megan Sterl – Dewberry
Cay Strother – Denver Water
Michelle Swanson – RMH Group
Pieter van der Mersch - ECO Associates

We would also like to thank all of our sponsors for this event. Sponsor names will be listed on signage at the conference. We would also like to thank all of speakers. Without everyone's support, this conference would not be possible.

Thank You,



Mike Harrington, Committee Chair

2015 Rocky Mountain Chapter ASHRAE Technical Conference “People, Passion and Performance”

7:30-8:00	Registration				
Tracks	HVAC&R Fundamentals	HVAC&R Systems & Applications	Sustainability	Building Automation	Critical Environments
Sponsor:	Western Mechanical Solutions	CFM Company	McNevin Company	Johnson Controls, Inc.	Air Purification
8:00-8:55	<i>Altitude Effects on System Design</i> Michael Haughey P.E., Siltertip Integrated Engineering Consultants	<i>Heating Water Boiler Systems For K-12</i> Jerry Bivens, LEED AP Envision Mechanical Engineers	<i>Denver Water Case Studies on Cooling Tower Water Efficiency</i> Rick Alvarado Denver Water	<i>Today's New Buildings Aren't As Smart As They Should Be</i> Kevin Zolitor Encore Electric	<i>Healthcare Codes and Standards</i> Mark Jelinske, P.E. Cator Ruma & Associates
9:00-9:55	<i>Psychrometrics</i> Michael Fulton, P.E. Western Mechanical Solutions	<i>Design and Economics of Commercial Ground Loop Heat Pump Systems</i> Alan Niles WaterFurnace International	<i>A Multi-Year, Multi-Building Retro-Commissioning Success Story</i> Pieter van der Mersch University of Colorado Boulder	<i>BAS Upgrade Decision: Full Replacement vs. Phased Migration</i> Steve Jones S4 Group	<i>Applying an Intelligent, High-Efficiency Energy Recovery System</i> Sean Convery, P.E. Cator, Ruma & Assoc. Mark Labac, P.E. Edge Mechanical Systems
9:55-10:25	Morning Break & Vendor Exhibits				
10:25-11:20	<i>The V in HVAC: Standard 62.1, The Interpretation and the Calculations</i> Rebecca Reel The RMH Group	<i>Application of VAV Terminals and Advanced Control Strategies for Terminals in HVAC Design</i> Dennis Sikkema Price Industries	<i>Liquid Desiccant Cooling Systems</i> Aaron Boranian Big Ladder Software Eric Kozubal National Renewable Energy Laboratory	<i>Factory vs. Field Mounting of BAS Controls</i> Shannon Emmel Western Mechanical Solutions Rob Lentz ATS Rocky Mountain	<i>A Holistic Overview of Technologies and Strategies to Achieve Deep Energy Reductions in Laboratories</i> Gordon Sharp Aircuity
11:25-12:50	Lunch Break and Keynote Address:	Achieving a Green Data Center: More Than a Good Design is Needed By: James K. Vallort ASHRAE Society Vice-President Sponsored by: Xcel Energy			
12:50-1:20	Vendor Exhibits				
1:20-2:15	<i>Fan Fundamentals</i> Ryan Johnson Twin City Fan	<i>Systems and Applications Roundtable: VRF Technology and Application</i> Charles Landherr Mitsubishi Electric Zach Pearson, P.E. M-E Engineers Jay Watson P.E. HPE Mar Ferguson, P.E. Colorado College	<i>Healthy Airside Solutions to Significantly Reduce your Building's Carbon Footprint</i> Gordon Sharp Aircuity	<i>Continuous Commissioning</i> Peter Bergquist Sky Foundry	<i>Seismic Considerations in Risk Category IV (Including Hospitals) Applications</i> James Tauby, P.E. Mason Industries
2:15-2:35	Afternoon Break & Vendor Exhibits				
2:35-3:30	<i>DDC Fundamentals</i> Ken Nekvasil ATS Rocky Mountain Shannon Emmel Western Mechanical Solutions	<i>Humidification Applications in Commercial HVAC, Healthcare and Data Centers</i> Mike Dovich Dristeem	<i>Denver Zoo, Zero Waste Program (Biomass Gasification)</i> Jennifer Hale Denver Zoo	<i>BACnet Overview</i> Ira Goldschmidt, P.E. Goldschmidt Engineering Solutions	<i>Common Design Practices for Grow Facilities</i> Brian Zimmerman, P.E. Impact Engineering Brian Lukus, P.E. Denver Fire Department Steve Ferguson Air Purification
3:35-5:00	Afternoon Technical Keynote Address And Open Bar	Closing the Comfort Gap–Are We Giving Building Owners The HVAC They Want? Larry Gelin, CFM Company Speaker Sponsored by: Xcel Energy			

Please note - Speakers and Topics Subject to Change – Some titles on this sheet are condensed for space purposes.

www.rockymtnashrae.com

People, Passion And Performance

For Whom:

Presentations for entry level and senior level engineers, architects, designers, students, salespersons, manufacturers, contractors, building officials, building owners, and building managers and operators.

Your Cost:

Prices before April 10th

Member ½ day:	\$ 125	(lunch included)
Member Full day:	\$ 175	(lunch included)
Non-Member ½ day:	\$ 150	(lunch included)
Non-Member Full day:	\$ 200	(lunch included)

(10% discount to companies sending 5 or more)

Prices After April 10th

Member ½ day:	\$ 150	(lunch included)
Member Full day:	\$ 195	(lunch included)
Non-Member ½ day:	\$ 170	(lunch included)
Non-Member Full day:	\$ 220	(lunch included)

(10% discount to companies sending 5 or more)

When & Where:

Friday, April 24, 2015 at the: Sheraton Denver West Hotel
360 Union Blvd.
Lakewood, CO 80228

Professional Development Hours (PDH):

A form is attached to document your participation in the Technical Conference, which assigns the appropriate PDHs to each session. The Chapter is working on GBCI credits. Please check the website for updates.

Luncheon Keynote Address:

Sponsored by: Western Mechanical Solutions

Achieving a Green Data Center: More Than a Good Design is Needed

The concept of a Green Data Center is difficult to see with a building full of computers consuming electricity. So the goal for a green data center is to minimize the energy consumed by the facility that does not go to computing power. To achieve this the site selection, facility program, design, installation and operations all play an equal role. Current trends and design strategies for high performance in various climates will be discussed. Also some keys to maintaining the edge of a high performance site such as Cx at turnover, seasonal testing, operations plans for changing IT loads, EBCx as operations change, Cx of added equipment during the life of the data center and most importantly - annual monitoring and operational adjustments. These concepts, success stories and some common pitfalls will be presented.

James K. Vallort, Fellow ASHRAE

ASHRAE Society Vice President 2014-15

Senior Vice President, Environmental Systems Design, Chicago, Ill.

Jim is the Practice leader for Energy + ECO, Controls and Commissioning at Environmental Systems Design Inc (ESD) located in Chicago Illinois.

Mr. Vallort currently serves as a member of Standard Project Committee 211P, Standard for Commercial Building Energy Audits, and Technical Committee (TC) 7.9, Building Commissioning.

He also served as chair of the CIBSE/ASHRAE 2000 Joint Conference Steering Committee, the Member Council ad hoc committee on young engineers and the Society Program Committee and vice chair of the CIBSE/ASHRAE 2003 Joint Conference steering committee.

He was president of the Illinois Chapter in 1999-2000. Vallort is the recipient of an Exceptional Service Award, a Distinguished Service Award and an Excellence in Engineering Award from the Illinois Chapter in 1998.

Afternoon Technical Keynote:

And Open Bar

Keynote Speaker Sponsored by: Xcel Energy

Closing the Comfort Gap – Are We Giving Building Owners the HVAC They Want

As an industry, we HVAC types are responsible for dealing with and managing energy use and temperature control in buildings. Since we understand the systems, our language and our emphasis always comes back to our areas of strength. But our customers – architects and end users – speak a different language. They are interested in the

productivity and comfort in their spaces and building performance means something different to them.

By taking advantage of some research that has been conducted by the CBE (Center for the Built Environment), the speaker will highlight the concepts that are getting renewed attention from owners and architects, and whether these new sciences represent an enhancement or a threat to our industry (hint: it depends on your attitude). Additionally he will report on some interviews with key developers, building owners, and architects to see if there is a gap between what we deliver as an industry and what our end clients' desire.

Larry Gelin, CFM Company Larry Gelin graduated from the University of Wisconsin-Madison with a BSME, and the University of Texas at Austin with an MSME with an emphasis in acoustics and noise control. Since then he has worked at Digisonix Inc. and Johns Manville, before becoming an HVAC sales representative in 2001. Larry has worked for CFM Company since 2003, where he has worked in contractor sales, product management, and finally his current role in engineering and end user sales.

7:30 - 8:00: Check-In / Registration

Track 1 – HVAC&R Fundamentals

Sponsored by: Western Mechanical Solutions

8:00 – 8:55: Altitude Effects on System Design

This talk focuses on a range of system design topics where an awareness of high altitude considerations is essential to good design. Given the current emphasis on "right-sizing", proper consideration of high altitude effects can make the difference between success and the other possibility. Subjects include airflow calculations, fan selection, ductwork, air-cooled equipment, cooling towers, motors, combustion equipment, pumps, evaporative coolers, shop drawing review to confirm compliance, and baseball. Even new types of equipment such as condensing boilers still require high altitude design consideration.

Speaker: Michael D. Haughey, P.E., HBDP, CEM, LEED AP

Michael is the Principal of Silvertip Integrated Engineering Consultants.

40 years of experience in HVAC & Mechanical consulting, facilities engineering, energy analysis, systems commissioning, systems troubleshooting, and sustainability consulting. Past President Rocky Mountain Chapter ASHRAE; CRES Board of Directors & Secretary, USGBC – Colorado Board of Directors, Education Director, Programs Coordinator, Greenbuild 2006 Host Committee Chair.; Keynote Speaker for the Rocky Mountain Chapter ASHRAE 2004 Annual Tech Conference. Past adjunct professor, HVAC Design, CU Denver and CU Boulder. Specialization in alternative and energy-conserving systems such as indirect-direct evaporative cooling, mass thermal storage, ice thermal storage, ground-source heat pumps, solar heating, energy

audits, energy retrofits, natural ventilation, peer review, troubleshooting, sustainability consultation, net-zero energy systems. Developed and presented over 60 seminars

9:00 – 9:55: Psychrometrics

This presentation will cover the basics of psychrometrics and the psychrometric chart. Terminology, chart layout, and uses will be discussed. How to use a psychrometric chart for system design will also be discussed.

Speaker: Michael Fulton, P.E., Western Mechanical Solutions

Michael Fulton, P.E. founded Western Mechanical Solutions to focus on minimizing the energy use of buildings through innovative application of engineering. WMS represents various energy recovery products. Mike has 26 years' experience in equipment sales, consulting and construction. He graduated from the University of Maine with a degree in Mechanical Engineering. He is actively involved with ASHRAE, past president of the Rocky Mountain Chapter (2002-2003), has been involved with the local ASHRAE tech conference since 1996, and has been the north section (Fort Collins) chair since 2008.

10:25 – 11:15: The V in HVAC: Standard 62.1, The Interpretation and the Calculations

Ventilation is code required, provides indoor air quality acceptable for occupants, and minimizes adverse health effects. This seminar covers a brief history of the standard, highlights from the standard including: air classifications and energy recovery, implications of standard interpretations, and the ventilation rate procedure calculation.

Speaker: Rebecca Reel, The RMH Group, Inc.

Rebecca Reel is a Mechanical Engineer with the RMH Group experienced in utilizing ASHRAE 62.1 in the design of a range of project types from office to laboratories. Rebecca has 8 years' experience in consulting and construction. She graduated from the University of Colorado at Boulder with a degree in mechanical engineering. In addition to mechanical design, Rebecca is the chair of energy modelers SimClub, serves on the USGBC CO board of directors, and appreciates good indoor air quality.

1:20 – 2:15: Fan Fundamentals

Attendees will be trained on the basics of commercial / industrial fans including common fan types and frequently used terms. Topics to be covered include the different types of impellers and reasons for using each, a general overview of fan construction options and why they should or should not be used for certain applications, as well as a high level discussion of other components (motors, v-belt drives, dampers, etc.) which can be added to fans.

Speaker: Ryan Johnson, Twin City Fan

Mr. Johnson has more than 15 years of experience in the HVAC industry and has held a variety of positions working for multiple equipment manufacturers. His roles have included technical product support and application as well as factory direct OEM and international sales. The majority of his work has been related to fans and blowers, but has also supported specific market segments such as laboratory exhaust systems, agricultural processes and mine / tunnel ventilation.

2:35 – 3:30: DDC Fundamentals

This presentation will cover the basics of DDC. This will include hardware topics such as controllers, inputs and outputs. We will also be learning about the software side of DDC which include interface software, custom control programming and protocols.

Speaker: Ken Nekvasil, ATS Rocky Mountain

Ken Nekvasil, Sales Manager for ATS Rocky Mountain, has been in the HVAC industry for nearly 30 years. He has extensive experience in building automation controls both from an operational and sales perspective. He is very familiar with BACnet based systems and integration to other systems

Speaker: Shannon Emmel, Western Mechanical Solutions

Shannon Emmel, Sales Engineer for Western Mechanical Solutions, has been in the HVAC industry for over 10 years. Prior to coming to WMS, she worked in applications department handling controls for AAON, Inc. She has experience in -custom roof top unit controls. She is familiar will both factory and field provided systems.



Track 2 – HVAC&R Systems & Applications

Sponsored by: CFM Company

8:00 – 8:55: Heating Water Boiler Systems For K-12

This presentation will focus on why heating water boiler systems may be utilized in lieu of all air systems, and analyze condensing vs. non-condensing vs. hybrid systems. He will review practical boiler considerations such as piping arrangements (primary-secondary and variable flow primary), integration with temperature control systems, boiler locations, and cost considerations. Finally, he will examine simplicity and complexity of boiler systems to deliver a total value to the owner in the K-12 market.

Speaker: Jerry K. Bivens, LEED AP, Envision Mechanical Engineers

Jerry currently is an Associate at Envision Mechanical Engineers. He has been in the consulting engineering field for almost 20 years who is registered in both Colorado and Arizona. He graduated from Northern Arizona University with a BS in Mechanical Engineering Technology. Jerry has a vast array of experience in the HVAC field including medical (hospital, MOB, and surgery centers), clean rooms and labs, office buildings and of over 10 years in the K-12 school market.

9:00 – 9:55: Design and Economics of Commercial Ground Loop Heat Pump Systems

This discussion concentrates on the economic impact of project specific variables as well as decisions made (or sometimes, not made) by the design engineer and how defining these details can greatly reduce the first cost of a Ground Loop Heat Pump (GLHP) system. This presentation begins with a quick overview of the components of the GLHP System, and the basic design and installation of the ground loop. Commercial Ground Loop Design Software is reviewed and then utilized to illustrate the economic impact of project specific variables. This discussion concludes with hybrid system design and the opportunities that hybrid systems offer in additional first cost reductions with minimum impact to the operating cost of the GLHP system.

Speaker: Alan Niles, WaterFurnace International

Alan Niles is a mechanical engineer with over 26 years of experience working with manufacturers of commercial water source heat pumps (WSHPs) and ground loop heat pumps (GLHPs) concentrating on commercial tower/boiler system design and commercial geo-exchange system design. He has been with WaterFurnace International, a manufacturer of WSHP's and GLHP's, since 2009. Alan earned his BSME at the University of Oklahoma in 1987 and received IGSHPA certification for commercial ground loop design and installation in 1989 and installation certification in 1993. Alan was elected in 2012 for the honor of Distinguished Lecturer for ASHRAE, speaking on the topics of economics and design of commercial ground loop systems.

10:25 – 11:15: Application of VAV Terminals and Advanced Control Strategies for Terminals in HVAC Design

Dennis will present a review of single duct, dual duct and fan power VAV terminal construction and application, in order to prepare attendees to review energy saving and advanced control strategies for terminals and fan coils, for both all-air systems and DOAS-decoupled systems with sensible heating and cooling in the occupied spaces. The results of an ASHRAE study of reduced minimum airflow setpoints will be also reviewed. Finally, strategies for proper terminal selection will be presented.

Speaker: Dennis Sikkema, Price Industries

Dennis Sikkema is the Director of Technical Sales for Price Industries Inc. of Atlanta, Georgia, and has been with the company for over 15 years. Prior to working for Price, he was with Tuttle & Bailey for 12 years as an Application Engineer, Product Manager, and a Regional Sales

Manager. Dennis began his career as an Application Engineer with Johnson Controls for 6 years and has a BSME from Western Michigan University. Dennis is a Member of ASHRAE and has been involved in ASHRAE and ARI committees. With over 33 years of experience in the industry, Dennis is an expert on numerous HVAC applications and actively provides training, project and design guidance throughout North America. At Price he oversees training programs and technical sales activities.

1:20 – 2:15: Systems and Applications

Roundtable: VRF Technology and Application

A mechanical contractor, a mechanical engineer, a plant manager, and a VRF equipment vendor will all answer six to eight prepared questions, in order to address from different perspectives the suitability of VRF equipment in various applications, the suitability of VRF in our climate, cost perspectives on the use of the technology, and design and comfort issues using the technology. After the prepared questions are answered, the audience will be invited to ask questions of the panel. All questions from the audience must be answered by all four roundtable members.

Speaker: Charlie Landherr, Mitsubishi Electric

Charlie has been the Mountain West regional sales manager for Mitsubishi Electric since 2006. He graduated from The University of Maryland, College Park, with a BSEE and a focus on microelectronics.

Speaker: Zach Pearson, P.E., LEED AP BD+C, M-E Engineers

Zach is responsible for mechanical system design at M-E Engineers where he has been the project manager for complex remodel projects, fast track projects, highly sustainable projects, historic renovations, and specialty systems including VRF. He graduated with a BSME from California Polytechnic State University in 2006.

Speaker: Jay Watson, P.E., Preconstruction Manager, HPE

Jay has been a part of the Project Development Department at HPE, a Design/Build contractor, since 2012. Prior to working for a contractor, he worked as a licensed Mechanical Engineer for 19 years at various engineering firms in the Denver area. He graduated from the Colorado School of Mines in 1991.

Speaker: Mark Ferguson, P.E. Colorado College

Mark graduated from the University of Colorado in mechanical engineering. He has an MBA in finance and a master's degree in engineering management.

2:35 – 3:30: Humidification Applications in Commercial HVAC, Healthcare and Data Centers

Since many trades come together for design and installation of humidification systems, careful selection and coordination of those systems is always a priority. In this seminar, the speaker will describe various humidification modalities from the traditional (steam distributing, duct mounted, AHU-mounted and area-type) to the non-traditional (atomizing and wetted media), and compare them in terms of their construction requirements, suitability for various projects, and energy use. He will also comment on a recent paper from the Joint Commission regarding suggested specifications for humidity in operating rooms at hospitals.

Speaker: Mike Dovich, Dristeem

Mike Dovich graduated from the Dunwoody Institute in 1988 with a degree in HVAC Design and Technology. He has been employed at Dristeem since 1992.



Rocky Mountain

Track 3 – Sustainability

Sponsored by: McNevin Company

8:00 – 8:55: Denver Water Case Studies on Cooling Tower Water Efficiency

This session will present the available rebates for water efficiency from Denver Water and discuss cooling tower water efficiency. Often energy efficiency takes center stage in HVAC design for green buildings. However, water efficiency is also an important factor in high performance building design, especially in an arid climate such as the West.

Speaker: Rick Alvarado, Denver Water

Mr. Alvarado has worked at Denver Water for 28 years. He began his career as a field technician in the meter reading department. In 2001, the conservation department enlisted some of the more experienced field personnel to implement a more extensive audit program. The program would be an additional tool to help the customer achieve water savings. Mr. Alvarado has been involved since the beginning of many of the conservation programs currently in place today. These would include irrigation and commercial industrial incentive programs, along with indoor and outdoor audits. Mr. Alvarado also began the first toilet replacement program which provided toilets and disposal to large apartment or townhome communities. In the last 14 years of conservation audits, Mr. Alvarado and the team he works with have been responsible for millions of gallons in savings and leak detection. Currently Mr. Alvarado has revitalized the "Cooling Tower Performance Rebate Program" by streamlining the criteria to include every cooling tower that has the opportunity for water savings. And by reaching out personally to Vendors and Facility engineers, sharing the benefits of the program and helping many facilities "Use only what they need".

9:00 – 9:55: A Multi-Year, Multi-Building Retro-Commissioning Success Story

University of Colorado Boulder has invested in a large retrocommissioning project to improve the operation and comfort of some facilities, along with reducing the energy use. This session will explore the retrocommissioning process using CU Boulder as an example. The benefits and challenges will be discussed as well as strategies for owners with multi-building campuses.

Speaker: Pieter van der Mersch, University of Colorado Boulder

Pieter L. van der Mersch, P.E. was born in Mexico in 1947 and emigrated to the U.S.A. in 1979. He holds a B.S. in Mechanical and Electrical Engineering from the Instituto Tecnológico de Monterrey, and obtained M.S. degrees in Industrial Engineering and Mechanical Engineering from universities in the U.S.A. He is a licensed professional engineer in Mexico and the U.S. Mr. van der Mersch is a life member of ASHRAE, a life member of the American Solar Energy Society (ASES), and a life and founding member of the Colorado Renewable Energy Society. He worked for eight years in the Product Engineering Department of the Monterrey, Mexico factory of John Deere, and worked in HVAC design since 1981. Most recently, he worked at the University of Colorado at Boulder from 1984 until his retirement in 2013, most of those years as Manager of Facilities Mechanical Engineering.

10:25– 11:15: Liquid Desiccant Cooling Systems

Removing moisture and heat using liquid desiccant cooling systems is a technology that has advantages in high performance buildings with advanced HVAC systems. Systems such as displacement ventilation, chilled beams, and radiant panels typically provide air at warmer temperatures which makes dehumidification more challenging than typical VAV systems. This session will explore this technology, it's applications, and it's benefits and challenges.

Speaker: Aaron Boranian, Big Ladder Software

Aaron Boranian holds a bachelor's degree in Civil Engineering from Colorado School of Mines and a master's degree in Civil Engineering from the University of Colorado at Boulder. He is also registered as an Engineer-In-Training in the state of Colorado. Mr. Boranian has been involved in building energy simulation for the past five years. During his master's studies, he conducted his thesis research at the National Renewable Energy Laboratory (NREL) on optimal control strategies for an innovative air conditioner that combines liquid desiccant dehumidification with indirect evaporative cooling. At NREL he created residential models to compare energy use of the device to conventional

air conditioners across eight climate zones. Before joining Big Ladder in 2014, Mr. Boranian worked for two years for the Sustainable Building Technologies group at the Energy Research Institute at Nanyang Technological University (ERI@N) in Singapore where he worked as an energy modeling consultant team for two new laboratory-intensive buildings and other projects.

Speaker: Eric Kozubal, National Renewable Energy Laboratory
Check back for bio.

1:20 – 2:15: Healthy Airside Solutions to Significantly Reduce Your Building's Carbon Footprint.

In the face of significant energy costs and concerns over global warming, buildings are receiving increasing scrutiny to reduce their carbon footprint and cut their energy expenses while still being sustainable and providing a healthy indoor environment. For many buildings, outside air is the largest single driver of both a building's energy efficiency and its indoor environmental quality however the results of using such approaches as economizers and demand control ventilation to optimize outside air have been mixed at best. This talk discusses and presents case studies on a new, more energy efficient and healthier approach to demand control ventilation as well as describes how economizers can be operated more reliably with greater energy efficiency in educational, commercial, and healthcare facilities.

Speaker: Gordon Sharp, Aircuity

Mr. Sharp is the chairman of Aircuity, Inc. and has over 25 years of wide-ranging entrepreneurial experience and more than 25 U.S. patents in the fields of energy efficiency and laboratory controls. As founder, former president and CEO of Phoenix Controls, he led the development of this world leader in laboratory airflow controls that was acquired by Honeywell in 1998. The technologies invented by Mr. Sharp at Phoenix Controls are today saving over \$1.5 billion annually in energy use. In 2000, Mr. Sharp founded Aircuity, which was spun out of Honeywell and is a smart airside energy efficiency company.

2:35 – 3:30: Denver Zoo, Zero Waste Program (Biomass Gasification)

Denver Zoo's Waste to Energy Program will convert 90% of the Zoo's waste (from trash to animal waste) to clean, sustainable energy by using a biomass gasification system. The process of becoming a zero waste facility by 2025 starts with reducing the waste stream and promoting recycling and ends with converting remaining waste to energy. The biomass gasification project will chemically convert zoo waste in a high temperature, low oxygen process into a usable combustible gas. The resulting energy generated is expected to meet 20% of the zoo's energy needs while managing the expectations of the owner and design team.

Speaker: Jennifer Hale, Denver Zoo

Jennifer Hale has worked at the Denver Zoo since 2009. As the Director of Safety and Sustainability, Ms. Hale leads a team of two in managing Denver Zoo's environmental, health and safety programs through our ISO 14001 and OHSAS 18001 certified Sustainable Management System. As the first zoo in the nation to receive dual certification for our entire operations, her leadership plays a critical role to the success of the program and the development of a culture at Denver Zoo that is committed to sustainable operations. Ms. Hale came to Denver Zoo with over 15 years of environmental, health and safety regulatory compliance experience, which includes five years of project management experience in environmental remediation. Ms. Hale has a Bachelor's of Science in Ecology and Evolutionary Biology from University of Arizona, and a Certificate for Sustainable Leadership and Implementation from Daniels College of Business at University of Denver. As a novice to fly fishing, she enjoys in her spare time exploring the beauty of Colorado and the Rocky Mountains.

Track 4 – Building Automation

Sponsored by: Johnson Controls, Inc.

8:00 – 8:55: Today's New Buildings Aren't As Smart As They Should Be

We've all been talking about Smart Buildings for over a decade. So why are we still designing much in the same way we did then? In that time Cat 5 has given way to Cat 6, but in most cases the systems that are designed and specified in this region today are as isolated and short-sighted as they were then, despite significant advancements in software, networking, product capabilities, and public perception. This discussion will explore the continued barriers to truly innovative design strategies, and examples of recent projects where collaboration and integration beyond the typical A&E establishment have yielded benefits beyond the sum of the parts.

Speaker: Kevin Zolitor, Encore Electric

Kevin Zolitor is the Building Technologies manager at Encore Electric in Englewood, CO. Kevin brings to Encore and their clients a diverse and unique technology background spanning networks of all kinds, physical and electronic security, database and machine communications, sound and video, lighting control, radio communications and more. His passion for the value of integration and connecting technology to the success of building stakeholders is visible in the many successful projects he has helped shape.

9:00 – 9:55: BAS Upgrade Decision: Full Replacement vs. Phased Migration

There comes a time when a building automation system comes to the end of its useful life. Sometimes your budget is not as big as you would like it to be. That's when you need to take a look at possibly a phased migration / upgrade of your existing building automation system. This session will explore the pros and cons of full replacement vs a phased migrations.

Speaker: Steve Jones, President S4 Group

Steve Jones is the owner and president of the S4 Group. He has many years of industry experience specifically related to developing integration solutions for the building automation controls industry.

10:25 – 11:15: Factory vs. Field Mounting of BAS Controls

This session will discuss the pros and cons of having factory provided controls versus field mounted controls. Topics will include the extent of the functionality they provide, cost considerations and the requirements of successfully implementing either solutions on a project.

Speaker: Shannon Emmel, Western Mechanical Solutions

Sales Engineer for Western Mechanical Solutions, has been in the HVAC industry for over 10 years. Prior to coming to WMS, she worked in applications department handling controls for Aeon, Inc. She has experience in -custom roof top unit controls. She is familiar with both factory and field provided systems.

Speaker: Rob Lentz,

Rob Lentz is the operations manager for ATS Rocky Mountain. After a nine year Navy career, he worked for General Electric & was the owner of APEX Automation. He started with ATS in 2004 & is primarily responsible for managing all operations in the Colorado and Wyoming area for this Alerton BAS contractor.

1:20 – 2:15: Continuous Commissioning

This session will begin by defining continuous commissioning. Then the discussion will turn towards the best way to use the emerging software tools in this market such as looking for broken equipment or identifying improperly operating equipment and being able to react to it before there is a failure.

Speaker: Peter Bergquist, Sky Foundry

This session will begin by defining continuous commissioning. Then the discussion will turn towards the best way to use the emerging software tools in this market such as looking for broken equipment or identifying improperly operating equipment and being able to react to it before there is a failure.



GBCI Credits Sponsored by: **COLORADO**

2:35 – 3:30: BACnet Overview

BACnet is a communications protocol for building automation and control networks. It is an ASHRAE, ANSI, and ISO standard[1] protocol. BACnet was designed to allow communication of building automation and control systems for applications such as heating, ventilating, and air-conditioning control, lighting control, access control, and fire detection systems and their associated equipment. This discussion will cover the fundamentals of BACnet such as the building blocks called objects all the way through the many services employed by the protocol.

Speaker: Ira Goldschmidt, P.E., LEED-AP, Goldschmidt Engineering Solutions, Inc.

Ira Goldschmidt P.E., LEED-AP, Goldschmidt Engineering Solutions, Inc. has nearly 40 years experience in the building design and construction industry, much of which has focused on building automation system design, integration, construction and commissioning. He co-authored the ASHRAE Guideline 13 on "Specifying Direct Digital Controls".

Track 5 – Critical Environments

Sponsored by: Air Purification

8:00 – 8:55: Healthcare Codes and Standards

ASHRAE Standard 170 is the most prevalent design guideline for ventilation in healthcare facilities (ANSI/ASHRAE/ASHE Approved). The last update was the 2008 issue, though multiple addendums have been issued since. Standard 170 was also incorporated into the 2010 edition of the FGI Guidelines. The ever changing healthcare environment and the continued maintenance of Standard 170 require constant attention to remain current on the topic. This topic discussion will primarily be a follow-up to last year's presentation with updates concerning 170 Standard, the FGI Guidelines and some relevant NFPA codes and standards.

Speaker: Mark Jelinske, P.E., Senior Associate; Cator Ruma & Assoc., Co.

Mark joined Cator, Ruma and Associates in 1996 and serves as a Senior Associate. His expertise ranges across several industries with a strong focus in healthcare. Mark is a professional engineer in Colorado and has been certified by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) as a Healthcare Facility Design Professional. He has conducted workshops at previous ASHRAE Technical Conferences on mechanical and HVAC code issues comparing the International Codes and current codes. He has served as a member of the City and County of Denver Mechanical and Gas Code Committee. He is called upon by his peers on many occasions to assist with code interpretation.

Mark has 27 years of experience and has a Bachelor of Science in Mechanical Engineering from the University of Missouri, Rolla.

9:00 – 9:55: Applying an Intelligent, High-Efficiency Energy Recovery System

During this presentation, Sean Convery of Cator, Ruma, & Associates and Mark Labac of Edge Mechanical Systems, Inc. will share how the University of Colorado Boulder Sustainability, Energy and Environment Complex (SEEC) implemented an intelligent, high-efficiency heat recovery system with evaporative cooling. In addition to the features of the system, they will share the financial and energy savings achieved by this project.

Speaker: Sean T. Convery, P.E. Principal; Cator Ruma & Assoc., Co.

Mechanical Principal at Cator, Ruma, & Associates in Denver, Colorado. His 19 years of mechanical design experience include energy-efficient mechanical systems for higher education campuses and research labs. Recent projects include the University of Colorado Boulder's Sustainability, Energy and Environment Complex (LEED Gold Pending), Biotechnology Building (LEED Platinum), and Colorado State University's Suzanne and Walter Scott, Jr. Bioengineering Building (LEED Gold).

Speaker: Mark Labac, P.E., President, Edge Mechanical Systems

Mark is the president of Edge Mechanical Systems, Inc., a specialty heating, ventilation, and air conditioning manufacturer's representative

firm in Colorado. The firm specializes in energy-efficient equipment with a focus on the laboratory industry and LEED projects.

10:25 – 11:15: A Holistic Overview of Technologies and Strategies to Achieve Deep Energy Reductions in Laboratories

As we strive to build more energy efficient laboratories and vivariums, the most impactful approach is often to reduce the outside airflow. In the last few years new design approaches such as demand based control of lab air change rates, chilled beams (hydronic cooling), and VAV exhaust fan control have been successfully employed to safely reduce these lab airflows to as low as 2 ACH to cut energy consumption significantly. Although these concepts may be discussed individually in the past, this talk provides a holistic discussion of how these and other energy saving technologies such as heat recovery can be combined to create a whole that is greater than the sum of the parts. Several case studies will be provided as well as the results of a sophisticated lab energy analysis tool to determine potential energy and capital cost savings for a typical lab building.

Speaker: Gordon P. Sharp, Chairman, Aircuity, Inc.

Mr. Sharp is the chairman of Aircuity, Inc. and has over 25 years of wide-ranging entrepreneurial experience and more than 25 U.S. patents in the fields of energy efficiency and laboratory controls. As founder, former president and CEO of Phoenix Controls, he led the development of this world leader in laboratory airflow controls that was acquired by Honeywell in 1998. The technologies invented by Mr. Sharp at Phoenix Controls are today saving over \$1.5 billion annually in energy use. In 2000, Mr. Sharp founded Aircuity, which was spun out of Honeywell and is a smart airside energy efficiency company.

1:20 – 2:35: Seismic Considerations in Risk Category IV (Including Hospitals) Applications

Mr. Tauby's presentation will encompass current and upcoming code standards with emphasis on seismic risk category IV (including hospitals) facilities.

Speaker: James Tauby, P.E., Mason Industries

Mr. Tauby is a licensed professional engineer and has been employed by Mason Industries for 25+ years. He is an active participant in ASHRAE for both vibration isolation as well as seismic considerations. Mr. Tauby is coauthor of ASHRE publication Practical Guide to Seismic Restraint, both 1st and 2nd edition.

2:35 – 3:30: Common Design Practices for Grow Facilities

This will be a panel to discuss the prevalent topics specifically regarding design of grow facilities.

Speaker: Brian Zimmerman, P.E. President, Impact Engineering
Check back for speaker bio.

Speaker: Brian Lukus, P.E., Denver Fire Department

Brian Lukus, PE, a seven-year member of the Denver (CO) Fire Department is a licensed fire protection engineer in the Fire Protection Division. He has a master of science degree in fire protection engineering from Worcester Polytechnic Institute. He also has five years of private fire protection consulting experience, served 10 years as a firefighter, and has Fire Officer 1 Pro Board certification.

Speaker: Kris Belter, AIA, Intergroup Architects

Check back for speaker bio.

Moderator: Steve Ferguson, Air Purification

Steve Ferguson is currently a Sales Engineer with Air Purification Company. Steve was a designer for 10 years with ME Engineers and Newcomb and Boyd. He moved back to Colorado in 2008 and became a Sales Engineer with JCI. He has been with Air Purification Company for about 2 years. Steve received his Bachelor's degree in Mechanical Engineering from Ohio State University.



**23rd Annual Technical Conference
Certificate of Attendance**

Sponsored by the Rocky Mountain Chapter of ASHRAE
April 24, 2015

	HVAC&R Fundamentals	IVAC Systems & Application	Sustainability	Building Automation	Critical Environments
8:00 - 8:55	Altitude Effects on System Design Michael Haughey, Silvertip Engineering	Heating Water Boiler Systems For K-12 Jerry Bivens, Envision Mechanical Engineers	Denver Water Case Studies on Cooling Tower Water Efficiency Rick Alvarado, Denver Water	Today's New Buildings Aren't As Smart As They Should Be Kevin Zolitor, Encore Electric	Healthcare Codes and Standards Mark Jelinske, Cator Ruma & Assoc, Co
9:00 - 9:55	Psychrometrics Mike Fulton, Western Mechanical Solutions	Design and Economic of Commercial Ground Loop Heat Pump Systems Alan Niles, WaterFurace International	A Multi-Year, Multi-Building Retro-Commissioning Success Story Pieter van der Mersch University of Colorado Boulder	BAS Upgrade Decision: Full Replacement vs. Phased Migration Steve Jones, S4 Group	Applying an Intelligent, High-Efficiency Energy Recovery System Sean Convery, Cator, Ruma & Assoc. Mark Labac, Edge Mechanical Systems
10:25 - 11:20	The V In HVAC: Standard 62.1, The Interpretation and the Calculations Rebecca Reel, The RMH Group	Application of VAV Terminals and Advanced Control Strategies for Dennis Sikkema, Price Industries	Liquid Desiccant Cooling Systems Eric Kozubal, National Renewable Energy Laboratory	Factory vs. Field Mounting of BAS Controls Shannon Emmel, Western Mechanical Solutions Rob Lentz ATS Rocky Mountain	A Holistic Overview of Technologies and Strategies to Achieve Deep Energy Reductions in Laboratories Gordon Sharp, Aircuity
Lunch	Keynote Speaker: Achieving a Green Data Center: More Than a Good Design is Needed James K. Vallort, ASHRAE Vice-President				
1:20 - 2:15	Fan Fundamentals Ryan Johnson, Twin City Fans	Systems and Applications Roundtable: VRF Technology and Charles Landherr, Mitsubishi Electric; Zach Pearson, M-E Engineers; Jay Watson, HPE; Mark Ferguson, Colorado College	Healthy Airside Solutions to Significantly Reduce Your Building's Carbon Footprint Gordon Sharp, Aircuity	Continuous Commissioning Peter Bergquist, Sky Foundry	Seismic Considerations in Risk Category IV (Including Hospitals) Applications James Tauby, Mason Industries
2:35 - 3:30	DDC Fundamentals Ken Nekvasil, ATS Rocky Mountain Shannon Emmel, Western Mechanical Solutions	Humidification Applications in Commercial HVAC, Healthcare and Data Centers Mike Dovich, Dristeem	Denver Zoo, Zero Waste Program (Biomass Gasification) -----, Denver Zoo	BACnet Overview Ira Goldschmidt, Goldschmidt Engineering Solutions	Common Design Practices for Grow Facilities Brian Zimmerman, Impact Engineering; Brian Lukus, Denver Fire Department;
3:35 - 5:00	Closing the Comfort Gap -- Are We Giving Building Owners The HVAC They Larry Gelin, CFM Company				
	_____ Signature of Participant				
	_____ Professional Development Hours Awarded _____ GBCI CMP CEU's (Approval Reference # ???) _____ ACAC RCs, (Recertification Credits) Awarded _____ ABIH CM Points (Continuing Maintenance Points) Awarded	_____ Signature of Chapter Officer			

REGISTRATION INFORMATION

23rd Annual Technical Conference
Friday, April 24, 2015
Sheraton Hotel Denver West – 360 Union Boulevard, Lakewood CO 80228

“People, Passion and Performance”

Presented by:
The ASHRAE Rocky Mountain Chapter

Register by April 10th, 2015 to ensure space availability.
Payments received after April 10th or walk-ins the day of the seminar will be accommodated pending space availability.

REGISTRATION AVAILABLE AT
WWW.ROCKYMTNASHRAE.COM

Attendee Prices before April 10:

Members Half Day: \$125 (includes 3 seminars, lunch and keynote presentation)
Members Full Day: \$175 (includes 6 seminars, lunch and keynote presentation)
Non-Members Half Day: \$150 (includes 3 seminars, lunch and keynote presentation)
Non-Members Full Day: \$200 (includes 6 seminars, lunch and keynote presentation)
Volume discount - 10% Discount for registering 5+ members

Attendee Prices after April 10th:

Members Half Day: \$150 (includes 3 seminars, lunch and keynote presentation)
Members Full Day: \$195 (includes 6 seminars, lunch and keynote presentation)
Non-Members Half Day: \$170 (includes 3 seminars, lunch and keynote presentation)
Non-Members Full Day: \$220 (includes 6 seminars, lunch and keynote presentation)
Volume discount - 10% Discount for registering 5+ members

Keynote speaker and Lunch Tickets:

\$50 for Keynote Presentation (ASHRAE Society VP Tom Workema) and lunch

All proceeds go toward ASHRAE Research and ASRHAE Endowed Research

For questions please contact:
Mike Harrington, 303-795-1000 or TechConference@rockymtnashrae.com