ASHRAE Rocky Mountain Chapter

21st Annual Technical Conference:

Broadening ASHRAE's Horizons

Friday April 19th, 2013

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

This year's Technical Conference theme is "Broadening ASHRAE's Horizons". Our Keynote Speaker will be Timothy G. Wentz, P.E., Fellow ASHRAE, ASHRAE-Certified High Performance Building Design Professional, associate professor, University of Nebraska – Lincoln. He is serving his second term as ASHRAE society Vice President and will be providing us an update regarding research projects being funded in Colorado and our region.

This year's conference will include the Fundamentals Track, Systems and Applications Track, the Sustainability Track, the Building Automation Track, and for the first time a Healthcare Track.

This is the 21st 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 USGBC/GBCI approved sessions.

Thank-you:

This event has been ongoing for over 20 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:

Michelle Swanson – RMH Group Committee Chair	Jon Rundquist – Air Purification Company
Cay Strother – Denver Water	Steve Dexter – Air Filter Solutions
Brian Lynch – Western Mechanical Solutions	Trevor Bromberg – McGrath, Inc.
Mike Fulton - Western Mechanical Solutions	Larry Gelin – CFM Company
Celeste Cizik – Eaton/EMC Engineers	Megan Van Wieren – Eaton/EMC Engineers
Bill Mele – Chemistry & Industrial Hygiene, Inc	Greg Bradshaw- Bradshaw Building Solutions
Mike Harrington – Setpoint Systems	Ramon Teran – Western Mechanical Solutions
Ira Goldschmidt – Goldschmidt Engineering	Craig Wanklyn – M-E Engineers
Jessie Jones – RMH Group	

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,

Jon Rundquist, Committee Chair

2013 Rocky Mountain Chapter ASHRAE Technical Conference "Broadening ASHRAE's Horizons"

7:30-8:00	Registration				
Tracks	**HVAC&R Fundamentals**	**HVAC&R Systems & Applications**	**Sustainability**	**Building Automation**	**Healthcare**
Sponsor:	**CFM Company**	**McNevin Company**	**Johnson Controls Inc.**	**LONG Building Technologies**	**Chemistry & Industrial Hygiene Inc.**
8:00-8:55	***Basics of Evaporative Cooling Design*** Rick Phillips RMH	***Air Distribution In Large Open Spaces*** Jerry Sipes, PH.D., P.E. Price Industries	***Examples of Commercial Scale GSHP System Performance*** Terry Proffer Major Geothermal	***DDC Basics*** Dave Kahn RMH	***Current Viable Air and Water Sampling Techniques Supporting Healthcare Environmental Infection Control Programs (EIC)*** Art Goguen Higgins and Associates
9:00-9:55	***Control Valve Authority and Pressure Independent Systems*** Hailey Mick TA Hydronic College	***HVAC Centrifugal Pumps*** Mark Jelinske Cator Ruma & Associates	***Data Center Retrofit Project: 90% Energy Use Reduction on a Budget*** Rich Osbaugh, RMH Otto Van Geet, NREL David Gallaher, NSIDC	***Complex & Effective Control Sequences*** Erik Jeannette, P.E. Eaton Energy Services	***Medical Gas Systems for Healthcare Based Facilities (Med Gas 101)*** R. Scott Jussel Medical Air Systems
9:55-10:10	**Morning Break & Vendor Exhibits**				
10:10-11:05	***Altitude Effects On System Design*** Michael Haughey Silvertip	***Variable Refrigerant Flow Systems*** Ken Urbanek MKK Consulting Engineers	***Energy Recovery: Saving Energy in Industrial Applications*** Juan Moreno Eaton Energy Solutions	***Practical and Energy Efficient Approaches to Ventilation*** Jarrel Wenger Engineering Economics, Inc.	***Patient Room Air Distribution using Displacement Ventilation or Active Chilled Beams*** Jerry Sipes, PH.D., P.E. Price Industries
11:05-11:30	**Vendor Exhibits**				
11:30-1:05	**Lunch Break and Keynote Address:**	**The Future of Our Industry and ASHRAE's Role** By: Timothy G. Wentz, P.E. Fellow ASHRAE, ASHRAE Vice-President Sponsored by: Western Mechanical Solutions			
1:05-1:35	**Vendor Exhibits**				
1:35-2:30	***Basic Fan Selection for LEED and Sustainable Design*** Jerry Kiel Lockheed Martin	***Performance Metrics for Physical Water Treatment Systems*** Michael Patton Griswold Water Systems	***Water Efficiency in Commercial Buildings*** Cindy Moe Denver Water	***Energy Information and Management Systems, Software, Audit Tools, and Some Boots-On-The-Ground Efficiency Technologies*** Mary Horsey E Source	***Effective Operating Room Air Distribution Design Procedures*** Mindy Espinosa Krueger
2:35-3:30	***Psychrometrics*** James Murphy LONG Building Technologies	***Evaporative Condensers*** Ilana Cember Baltimore Air Coil	***An Introduction to OpenStudio, a Development Platform for Building Energy Modeling*** Dr. Larry Brackney, NREL Andrew Parker, NREL	***DDC Controls Best Installation Practices*** Rob Lentz ATS Rocky Mountain	***Benefits and Applications of Venturi Valves in Healthcare*** Cheryl Laniewicz Phoenix Controls Dan Prusia Phoenix Controls
3:35-4:30	***Energy Use In Refrigeration*** Scott Martin, P.E., LEED AP Integrated Building Solutions	***Indirect Evaporative Cooling Applications*** Michael Haughey Silvertip	***Displacement Ventilation: Design Considerations, Operational Advantages and Case Studies*** Barry Stamp Shaffer Baucom Engineering & Consulting	***Utilizing the BAS for Monitoring & Validation Procedures*** Steve Meyer, CEM, P.E. PCD Engineering	***Commissioning of Healthcare Facilities*** Lisa Doughty, PE, LEED AP Engineering Economics, Inc.
4:30-5:00	**Conference Conclusion and Cash Bar**				

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

www.rockymtnashrae.com

"Broadening ASHRAE's Horizons"

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.

When:

Friday, April 19, 2013

Your Cost:

(Early registration before April 5th)
½ day: $ 125 (lunch included)
Full day: $ 175 (lunch included)
(10% discount to companies sending 5 or more)

Cost for late registration after April 5th
½ day: $ 150 (lunch included)
Full day: $ 190 (lunch included)

Professional Development Hours (PDH):

A form will be available at the registration desk 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.

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

Luncheon Keynote Address:

Sponsored by: Western Mechanical Solutions

The Future of Our Industry and ASHRAE's Role

The presentation takes a look into the speaker's "crystal ball" to identify trends and developments that will impact our industry. We will explore questions such as, what are some of the pitfalls and dangers that await us in the future? Where are the opportunities that always accompany these dangers? And, most importantly, what is ASHRAE doing to help its membership success in this rapidly changing environment. One specific challenge ASHRAE will face is in research so this presentation will also discuss AHRAE's Research efforts and specifically those in Colorado.

Timothy G. Wentz, P.E., Fellow ASHRAE, ASHRAE-Certified High Performance Building Design Professional, associate professor, University of Nebraska – Lincoln. As vice president, Wentz is a member of the Board of Directors and the Executive Committee and serves as chair of Publishing and Education Council. Wentz is serving his second term on the Board as vice president and formerly served as Region IX director and regional chair. He is webmaster for Region IX and the Nebraska Chapter and advisor for the University of Nebraska Student Branch.
Past service includes chair of the Certification Committee, vice chair of the Professional Development Committee, member of the Nominating Committee and the Finance committee. He is the recipient of the E.K. Campbell Award of Merit, a Region IX Regional Award of Merit, a Region IX Chapter President of the Year and a Regional Energy Award. Wentz was awarded a Bachelor of Science in mechanical engineering and a master's degree in business administration from the University of Nebraska.

Track 1 – HVAC&R Fundamentals

Sponsored by: McNevin Company

8:00 – 8:55: Basics of Evaporative Cooling Design

Evaporative cooling can provide a significant amount of the cooling needs in this climate, but it has developed a reputation as being problematic, and consequently is not used as much as it should for high-end commercial applications. This talk will cover the performance of evaporative cooling systems, debunk the myths and explain how it can be applied so that problems are minimized. When applied in conjunction with chilled water cooling, energy savings of 30% can be achieved, which can provide four LEED points. Case histories of successful projects will be presented.
Speaker: Rick Phillips is a Senior Engineer with the RMH Group. He has more than 25 years experience in the HVAC industry; including 6 years as a facilities engineer for the University of Colorado at Boulder, 5 years as a design engineer for in-house construction crews at the CU Medical Center, and 15 years as a consultant.

9:00 – 9:55: Control Valve Authority and Pressure Independent Systems

The presentation will address challenges in hydronic systems, allowing participants to understand how pressure changes in a dynamic system can affect building control, balancing, energy efficiency. The challenges of building owners, designers, and contractors to not only provide the basic creature comforts but also do so in a cost effective and energy efficient way. In a variable flow system, diff press control is critical to achieve successful balancing under all operating conditions at all heat transfer devices. We will examine how a designer might employ multiple devices in an attempt to achieve the required flow at various levels of operation.
Speaker: Hailey Mick has a Bachelor's of Chemical Engineering from Auburn University and has been in the commercial heating and cooling industry for seven years. Hailey has been involved with system design, equipment design, and sales. Customer training has been a vital part of her position in each role. Having the opportunity to work with individuals to offer innovative, energy efficient solutions sized for each customer's budget and timeline is what Hailey enjoys most about her job. Hailey is a member of the ASHRAE Technical Committees on Hydronic & Steam Heating Equipment & Systems - 6.1 and on Testing and Balancing - 7.7

10:10–11:05: 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 Haughey is the owner of Silvertip Integrated Engineering Consultants. He has a BSME with 39 years of experience in HVAC & Mechanical consulting, facilities engineering, energy analysis, systems commissioning, systems troubleshooting, and sustainability consulting. He is a Past President Rocky Mountain Chapter ASHRAE. Presents seminars on various topics including Low Energy Mechanical Systems, USGBC-LEED Overview, Ground Source Heat Pumps, LEED EB, High Altitude Design, Ice Thermal Storage, Economizers, Living Buildings, and Seismic Risk in Colorado, Living Buildings, and Sustainable Design. Traditional mechanical design experience with 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 retrofit design, daylighting and natural ventilation integration with mechanical systems, commissioning peer review, troubleshooting, sustainability & LEED consultation, net-zero energy systems, and career specialization in energy efficient design

1:35 – 2:30: Basic Fan Selection for LEED and Sustainable Design

This presentation on "Basic Fan Selection for LEED & Sustainable Design Applications" will cover the basic information needed to properly select and install a fan in a duct or air handling system. The presentation reviews basic fan types, proper application of the fan to the design constraints, fan energy efficiency and sustainability, and trouble shooting of fans in existing operating systems. This Power Point presentation is presented in an "ASHRAE Format" and therefore does not endorse or promote any vendors product offering by company or trade name.

Speaker: Jerry Kiel is a Senior Staff Mechanical Engineer with Lockheed Martin SSC. He has a BSME from University of Missouri Rolla, MSME from Colorado State University, LEED AP BD+C, CEM for State of CO and WY, and PE in CO, MO, and NV. He has acquired over 40 years of professional experience as a Consulting Mechanical Engineer, specializing in sustainable and energy efficient designs of buildings. He has served as President of the Rocky Mountain Chapter of ASHRAE and Chairman of ASHRAE's Region Nine Energy and Technical Affairs Committee

2:35 – 3:30: Psychrometrics

An introduction to the Psychrometric chart. Starting with basic reading of and plotting points on the Chart. Moving into modeling cooling and heating systems with the Psychrometric chart, along with trouble shooting systems by using Psychrometrics.

Speaker: James Murphy, Sales Engineer, LONG Building Technologies, BSME Vanderbilt University '98, 13 Years Applied Equipment Sales Specializing in Chillers, Custom Air handling units, Applied Product, focusing mainly on engineering.

3:35 – 4:30: Energy Use in Refrigeration Systems

The concept of mechanical refrigeration has been around for 100 years. Although systems have advanced over this time period, they all follow basic principles common to all systems. This presentation will cover the basic concepts of a refrigeration system. We will discuss refrigerant properties and their impact on the environment and systems. After this session you will be able to identify which system design parameters increase system energy. You will understand typical accessories and their uses. We will discuss piping and sizing. An example of a system with calculations will be presented.

Speaker: Scott Martin, PE, LEED AP is a Principal at integrated Building Solutions and has 20 years of diverse experience in sales and consulting here in the Colorado construction market. Much of his experience is in low energy systems for institutional and commercial buildings. He is a past president of the Rocky Mountain Chapter of ASHRAE.

Track 2 – HVAC&R Systems & Applications

Sponsored by: CFM Company

8:00 – 8:55: Air Distribution in Large Open Spaces

The effectiveness of air distribution for large open spaces is often impacted by the type of air distribution and by how the diffuser is installed to meet the interior architectural requirements. The use of mixing air distribution, partially stratified air distribution, stratified air distribution and hydronic cooling / heating will be discussed for Classrooms, Lecture Halls, Auditoriums, Gymnasiums, Sports Arenas, Houses of Worship, Atriums, and Natatoriums. Since the air distribution device performance listed in a manufacturer's catalog is based upon ideal inlet conditions and isothermal supply air, a discussion on discharge air temperature will include correction factors. Examples of installations comparing these air distribution methods for classrooms, gymnasiums and auditoriums will be given.

Speaker: Jerry Sipes is the Vice President of Engineering for Price Industries and is a Professional Engineer with more than twenty years of experience in the HVAC field. He has a Ph.D. in Mechanical Engineering and his technical areas of interest are heat transfer, fluid flow, human thermal comfort, HVAC and acoustics. He serves at the national level of ASHRAE, AHRI and USGBC. At AHRI, he is the past chairman of the Air Control and Distribution Devices (ACDD) Section, the chairman of the ACDD and Chilled Beams engineering committees, member of the AHRI Compliance Committee and is the chairman of the ARHI Standard 1240P, Performance Rating of Active Chilled Beam Units. At ASHRAE, he is the vice chairman of ASHRAE Technical Committee 5.3 Room Air Distribution, chairman of standard 200, Method of Testing for Chilled Beams, member of standard 79, and past chairman of standard 130, Methods of Testing for Rating Ducted Air Terminal Units.

9:00 – 9:55: HVAC Centrifugal Pumps

The presentation will cover the basics of how centrifugal pumps work, their operating characteristics, and proper selection. The application of centrifugal pumps in both open and closed systems will be discussed. The interaction of pumps and systems will be discussed including primary secondary, variable primary and many of the variations on these themes

Speakers: Mark Jelinske is a Senior Associate at Cator, Ruma, and Associates and has over 25 years of experience with mechanical building systems. Mark provides in-house technical expertise and mentoring for the Mechanical Engineering staff at CRA. He has specialized in healthcare for most of his career, but also includes most categories of commercial and institutional buildings in his resume. He is an ASHRAE member and past president of the Rocky Mountain Chapter, is the Colorado Chapter Code Advocate for the American Society of Healthcare Engineering, and is a member of the NFPA and the International Code Council.

10:10–11:05: Variable Refrigerant Flow Systems

Variable Refrigerant Flow (VRF) Systems have seen increasingly higher levels of use within the region. Specifically they are being used more and more within high performance building designs on account of their ability to provide energy recovery and low energy consumption performance. This session will give the attendee a review of VRF systems. It will also tell the attendee how to design and specify these systems. All of this will be portrayed from an engineer's perspective.

Speaker: Ken Urbanek, PE, ASHRAE HBDP, LEED AP is the Director of Engineering at MKK Consulting Engineers, Inc. Ken received a B.S. degree in Architectural Engineering from the University of Wyoming where he specialized in Building Mechanical Systems. Ken has extensive experience working in high performance building design including the design and construction of the Denver Department of Human Services Eastside Facility which is a LEED Gold building currently implementing Measurement & Verification. This building makes use of an under floor air distribution system in addition to a variable refrigerant flow heat pump system. Ken is also a Rocky Mountain ASHRAE Chapter Past-President.

1:35 – 2:30: Performance Metrics for Physical Water Treatment Systems

We will examine the performance metrics for physical water treatment for cooling water systems. How does one evaluate corrosion, biological growth, deposition, and solids control in modern water treatment systems, and how does physical water treatment measure up to long-held beliefs? We will explore corrosion, deposition and biological control methods, including additive chemistry. We'll also explore physical water treatment for closed loop heating systems, and why this is important to modern boiler equipment.

Speaker: Michael Patton has been a technical sales leader in the environmental, energy, and water industry for more than 15 years. Prior to joining Griswold Water Systems, Michael was Vice President of Sales for Evandtec, in Toronto. Previously he served as the General Manager of the Energy and Environment Services group for a large contractor in Dubai, UAE. A Member of ASHRAE, he serves as an active member of two technical committees related to his field, and also on Standards Project Committee 188P charged with developing a standard for the prevention of legionellosis; and Standard 191P, tasked with crafting a blueprint for efficient use of water in buildings. He was also recently appointed to a four-year term with the ASHRAE Society Handbook Committee. Michael has more than 30 years of experience in the Mechanical Engineering field.

2:35 – 3:30: Evaporative Condensers

An introduction to evaporative condensers is provided, including how they work, their components and principles of operation. Their economic trade-offs are considered vs. air cooled condensers or complete water-cooled systems. Their operational range and off-peak methods of control are presented, along with general operation and maintenance. Finally, methods of selection and specification are presented.

Speaker: Ilana Cember works at Baltimore Air Coil in the refrigeration department as the Senior Applications Engineer. She is responsible for the design and application of evaporatively-cooled condensers and provides instruction regarding refrigerant choice, pressure drop, air velocities, and structural attachment. She received her BS in Mechanical Engineering from Johns Hopkins University in 2010 with a concentration in Energy Engineering. She is a LEED Green Associate, a Certified Energy Manager in Training and a Professional Engineer in Training.

3:35 – 4:30: Indirect Evaporative Cooling Applications

Presentation of some of the many indirect evaporative cooling technologies and combinations with other technologies. Discussion of calculations, psychrometric evaluation, energy-efficiency, potentially good applications for indirect evaporative cooling, and especially when it may not be appropriate.

Speaker: Michael Haughey is the owner of Silvertip Integrated Engineering Consultants. BSME with 39 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, USGBC - Colorado Board of Directors, Education Director, Programs Coordinator, Greenbuild 2006 Host Committee Chair.; Member AIA Colorado Committee on the Environment, AEE, RMAEE, and the Colorado Earthquake Hazard Mitigation Council. Keynote Speaker for the Rocky Mountain Chapter ASHRAE 2004 Annual Tech Conference. Past instructor, HVAC Design, CU Denver and CU Boulder. Traditional mechanical design experience with specialization in alternative and energy-conserving systems

Track 3 – Sustainability

Sponsored by: Johnson Controls, Inc.

8:00 – 8:55: Examples of Commercial Scale GSHP System Performance

Most engineering teams generate substantial, detailed operating performance projections for their commercial and institutional GSHP systems, but rarely are these systems tracked or monitored to compare these predicted estimates. This presentation will review selected systems that have sufficient trending components to make comparisons between calculated performance vs. actual, and discuss why most installations exhibit greater performance than expected.

Speakers: Terry Proffer has been involved with the GSHP trades since 1992, after several years in the oil industry as a geologist. Mr. Proffer is an IGSHPA Installation Trainer, IGSHPA CGD+ trainer and ClimateMaster Certified Installation & Service Trainer; is a guest lecturer at Colorado School of Mines, adviser to NREL's Geothermal Road Map project, provided input to various state and local agencies regarding regulatory issues, and is a board member for the Colorado Geo Energy and Heat Pump Association (CoGEHPA).

9:00 – 9:05: Data Center Retrofit Project: 90% Energy Use Reduction on a Budget

The National Snow and Ice Data Center (NSIDC) is an NSF- and NASA-funded facility housed at the University of Colorado that crunches and stores some of the most important Earth-observing satellite data produced to track changes in climate. Using only off-the-shelf technology, they retrofitted an operating data center in a 1960s concrete-and-cinder-block building, and achieved an operating PUE of 1.08. They cut their cooling load by more than 80 percent, even in the hottest parts of the summer. The addition of a 50-kilowatt solar photovoltaic system on the roof turned their data center into a zero-net-energy installation. In this special session, we'll take a short field trip through the NSIDC. Rick Osbaugh, the project engineer, will tell us how the project was born, what the challenges were, and why the governor and both U.S. senators from Colorado felt compelled to take time out of their busy schedules to see the facility.

Speaker: Rick Osbaugh is a true innovator in the industry and his role is to help The RMH Group remain positioned at the forefront of low-energy mechanical system design. He has been designing low-energy-use systems for more than 30 years and has garnered international attention for this work as early as 1983 for his design of an office building in Lakewood, Colorado. He recently developed innovative design solutions for one of the largest GSA retrofit projects in the nation—the Byron Rogers Federal Office Building Modernization, in Denver, Colorado—that is projected to significantly reduce energy consumption. Rick holds a BS in mechanical engineering from the University of Colorado Boulder.

Otto Van Geet is a senior engineer at the National Renewable Energy Laboratory (NREL), and is currently engaged in The Department of Energy Federal Energy Management Program that seeks to facilitate implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship. Mr. Van Geet is one of the founding members of Labs21, a voluntary program dedicated to improving the environmental performance of U.S. laboratories and has been involved in the design, construction, and operation of energy efficient research and support facilities such as labs, data centers and office buildings. Mr. Van Geet truly believes in his mission at NREL—he and his family live in a passive solar home that is completely off the grid which he designed and built in 1998.

David Gallaher is an Associate Scientist III, Manager of Information Technology Services at the National Snow and Ice Data Center (NSIDC). Dave is leading the technical evolution of NSIDC systems and architecture to meet the needs of our scientific communities and stakeholders. This evolution includes advanced data products, dynamic data visualization, and enhanced data discovery. At the same time, he is focusing on evolving internal and external systems integration, and on refining technologies and infrastructures to be more user-friendly, efficient, cost-effective, and scalable, while continuing to support the core data ingest and distribution functions. Dave holds a Bachelor of Science degree in Geology from the University of Illinois and a Master of Science degree in Geology from Northern Arizona University.

10:10–11:05: Energy Recovery: Saving Energy in Industrial Applications

With a variety of processes, there is a large amount of waste heat generated that could be captured and applied to another step in the process. This presentation will cover various heat transfer technologies and show how they can be applied to specific industrial applications. It will include lessons learned in the analysis, design, and implementation of these technologies.

Speaker: Juan has over 13 years of experience in mechanical building systems engineering. He has worked on a broad range of facility types and his areas of expertise include thermal load calculations, application and use of psychrometrics, and central chiller and hot water plant design. Juan has experience in industrial process HVAC design including critical processes, clean rooms and strict relative humidity and temperature control. Juan also has experience with digital control system design, HVAC systems commissioning, troubleshooting and balancing.

1:35 – 2:30: Water Efficiency in Commercial Buildings

Learn how to make your building water efficient and hear the latest update on the Front Range drought

Speaker: Cindy Moe, PE, works with some of Denver WaterÕs largest customers, helping them find ways to reduce their water usage. Cindy uses her engineering expertise to help commercial, industrial and institutional (CII)Êcustomers cut their bills by conserving water. She also manages an incentive program to helpÊCII customers employ water-saving technologies or add new equipment. Cindy earned a BachelorÕs degree in Engineering from the Colorado School of Mines and a MasterÕs degree in Civil Engineering from the University of Colorado at Denver.

2:35 – 3:30: An Introduction to OpenStudio, a Development Platform for Building Energy Modeling

This session provides an overview of the Department of Energy's free platform for rapid development of building energy modeling desktop, mobile, and web tools. Application examples will include OpenStudio-based tools for A&E practitioners, energy auditors, and utility incentive programs. The presentation will conclude with an overview of near-term development activities.

Speaker: Dr. Larry Brackney is the section manager for sensors, controls, and analysis tools for Commercial Buildings Research at the National Renewable Energy Laboratory (NREL). Dr. Brackney joined NREL in 2009 after teaching electrical and mechatronics engineering at the University of Canterbury in New Zealand for two years. Previously, he spent 12 years working in research and advanced product development for the automotive industry. An expert in applied controls and systems modeling, Dr. Brackney has extensive experience developing and deploying advanced control systems for a variety of complex systems. Dr. Brackney earned B.S. and M.S. degrees in mechanical engineering from the Rose-Hulman Institute of Technology and a Ph.D. in mechanical engineering at Purdue University, specializing in intelligent and adaptive management systems for energy efficient buildings.

Andrew Parker is an application engineer and OpenStudio developer for Commercial Buildings at the National Renewable Energy Laboratory (NREL:). He specializes in automated energy auditing and design assistance program workflow development was well as procedural modeling for large scale analysis. Mr. Parker earned a BS in Textile Engineering at NC State University before interning at a mechanical engineering company where he performed LEED certification and energy simulation. He continued further study in residential energy simulation and architectural engineering at the University of Nebraska before joining NREL.

3:35 – 4:30: Displacement Ventilation: Design Considerations, Operational Advantages and Case Studies

This session provides an overview of Displacement Ventilation in practice, important design considerations, how displacement ventilation contributes to improved indoor conditions, and case studies of displacement applications and room air flow behavior.

Speaker: Barry Stamp, Principal at Shaffer · Baucom Engineering & Consulting, has more than 27 years of experience in consulting engineering including experience in Integrated Design applying sustainable design techniques and standards for LEED certification. Mr. Stamp is a graduate of the University of Colorado, where he received his BSAE with an emphasis in Building Energy Engineering. Mr. Stamp is one of the region's leading experts in the utilization of CFD modeling and sustainable design. Mr. Stamp was an active participant on the advisory committee to the Governor's Energy Office (GEO) effort to assemble the CO-CHPS program, which creates a benchmark for the design and construction of Colorado high performance schools.

Track 4 – Building Automation

Sponsored by: LONG Building Technologies

8:00 – 8:55: DDC Basics

This presentation discusses the fundamental components and concepts used in modern temperature control systems. Selection and proper installation of field devices, including valves, dampers, temperature and pressure sensors as well as the safety devices will be covered. Basic control concepts, including two position and modulation with PID, will be presented with examples. BAS panel types, operator interfaces and different programming languages will also be covered. The presentation will conclude with an overview of the ASHRAE publications that provide additional information on specifying DDC equipment and developing sequences of operation.

Speaker: Dave Kahn is the Chief Mechanical Engineer with The RMH Group, Inc., with over 20 years' experience designing HVAC and control systems for a wide variety of facilities. He also has 10 years' experience as a controls contractor. Dave has served as chair of ASHRAE Technical Committee 1.4, Control Theory and Application, is Vice-Chair of SGPC 13 "Specifying Direct Digital Control Systems•, and is an ICC plans examiner for the International Building Code.

9:00 – 9:55: Complex & Effective Control Sequences

This seminar will define various levels of complexity of building automation system (BAS) control sequences, and it will teach the audience why some complex sequence and BAS programs are required to achieve energy efficiency goals while maintaining occupant comfort. Some sequences covered include variable air volume fan airflow control vs. duct pressure control, optimized heating plant enable and set points, dealing with DX and evaporative cooling, and the importance of the PID equation in determining set points.

Speakers: Erik Jeannette has been in the HVAC controls industry for 18 years and he is a licensed mechanical engineer and a senior engineer at Eaton's Energy Solutions. There he manages existing building and new construction commissioning projects, as well as metering and controls design projects. Brian Barnes is currently an Area Technical Specialist for Siemens. His roles includes teaching Siemens technicians how to integrate to third party devices in addition to being the resource for large scale and complicated integrations to equipment such as HVAC, electrical, fire life safety and security systems.

10:10 – 11:05: Practical and Energy Efficient Approaches to Ventilation

This seminar will cover ASHRAE Standard 62.1 requirements and options, including ventilation rate procedure, IAQ procedures and multi zone systems. Also we will cover the energy impact of ventilation on cooling, heating and reheat systems. But most important Jarrell will strategies for reduced energy impact (both advantages & disadvantages) of dedicated outdoor air systems, demand controlled ventilation and zone-level strategies.

Speaker : Jarrell Wenger has 28 years of HVAC engineering experience and has developed expertise in energy efficiency, controls and IAQ, currently applied through commissioning as a principal with Engineering Economics, Inc.

1:35 – 2:30: Energy Information and Management Systems, Software Audit Tools, and Some Boots-On-The-Ground Efficiency Technologies

The sophistication of building automation systems (BASs) is driving a paradigm shift in how we interact with those systems. The increasing complexity of today's BAS interfaces and controls have exceeded the ability of most building operators to maximize BAS potential for efficient building operations. Despite this disconnect, marketing efforts by major BAS manufacturers continue to offer ever-more enticing features. We'll consider the potential effects of this paradigm shift on building energy efficiency and take a close look at some emerging controls technologies that may either add to the complexity or offer some much-needed clarity. We'll also examine some retrofit RTU efficiency technologies and retrofit controls that bring DDC functionality to legacy pneumatic systems.

Speaker: Mary Horsey, a research manager at E Source, investigates and writes reports on specific technologies as a member of the technology assessment team. Her areas of expertise include HVAC systems and controls, building energy management, control systems, and energy efficiency. Before joining E Source, she gained considerable hands-on experience, first as an energy systems engineer with Georgetown University Facilities Management and then as an energy engineer for Boulder County, Colorado, where she managed the building energy systems and designed and implemented energy-efficiency projects for nine years. Mary holds a BS in mechanical engineering from Colorado State University and a BA in liberal arts from St. John's College in Santa Fe. She is a Certified Energy Manager (CEM) and a LEED (Leadership in Energy and Environmental Design) Accredited Professional.

2:35-3:30: DDC Controls Best Installation Practices

This seminar will be targeted for designers and contractors to help with both installation specs & procedures. Issues being covered include the do's and don'ts in regards to wiring a BACnet system, accountability & responsibilities for proper "point to point" connections, documentation and commissioning of a system,
Submittals, the importance of accurate As-Builts process, sample wiring standards plus wiring coordination with other vendors that typically interface with DDC systems.
Speaker: 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.

3:35-4:30: Utilizing the BAS for Monitoring & Validation Procedures

More and more owners are signing on for monitoring and verification services, whether to meet mandated project requirements or as a mechanism to provide proof of building energy performance (or lack thereof). Effective M&V brings many perspectives that come together, and the introduction of M&V on projects brings along benefits but also potential issues such as increased risks for design/build/operate teams and how to best fit the cost for M&V into a given project budget.
Building automation systems are an essential part to the application of ongoing M&V. This presentation will review the use of automation for M&V of building performance as well as examine the cost-effectiveness side of M&V. If we are to advance this still emergency building practice, engineers need to be able to communicate the value within the process. Effective M&V by definition should be expanded from application of traditional adherence to M&V protocols and LEED requirements, to allow application in any facility where the staff can gain value from trend-based analysis. Speakers will present cost-effective, real world strategies for owners, operators and engineers to apply simple trending/charting to produce measureable results.
Speakers: Steven Meyer, CEM, P.E. has 29 years of commercial, institutional, and industrial HVAC/R engineering and construction experience. Steven graduated from the University of Wyoming and spent 20 years as a project manager for Colorado State University in Fort Collins managing a variety of design and construction projects prior to joining PCD Engineering. Steve has expertise in facility operations deficiency analysis, on-site investigation and verification, system monitoring with direct digital controls and field-installed equipment. His systems experience includes facility and campus central plants, air and waterside HVAC systems, refrigeration, plumbing systems, commercial kitchens and compressed air. His past experience includes service as facilities manager, design/analysis engineer, project manager, energy audit engineer, mechanical construction estimator, field HVAC technician and pipe fitter.
Peter D'Antonio, P.E., CEM, LEED AP is President at PCD Engineering and has held the role of general contractor, engineer and planner and is an accomplished author on building energy efficiency in addition to continuing his passion as a working engineer. His work has been recognized with design and service awards from various organizations such as the Poudre School District, US Environmental Protection Agency, US Green Building Council, Colorado Governor's Energy Office and Colorado Renewable Energy Society. Prior to founding PCD Engineering, Peter served as senior project manager for a national energy services company, managing the design and construction of large scale, energy saving, facility improvement projects in the commercial and industrial sectors and worked at the top 50 A/E firm Dewberry. He holds bachelor and master degrees in civil engineering from the University of Maryland and University of Colorado.

ASHRAE Rocky Mountain Chapter

Track 5 – Healthcare

Sponsored by: Chemistry & Industrial Hygiene, Inc.

8:00 – 8:55: Current Viable Air and Water Sampling Techniques Supporting Healthcare Environmental Infection Control (EIC) Programs

Microbial air and water sampling in US healthcare facilities remains a controversial subject because there are no current standards in the United States. However, if properly performed, there are current techniques in air and water microbial sampling that can benefit a healthcare facility's overall EIC management program. Mr. Goguen will present various water and air viable sampling techniques that are currently being employed in hospitals as part of their overall EIC management program.
Speaker: Art Goguen is currently the director of environmental health and safety (EHS) for Higgins and Associates, LLC (Higgins); an EHS Consulting firm in Englewood, Colorado. Higgins has been assisting healthcare clients with their environmental infection control programs by providing comprehensive air and water sampling programs. Mr. Goguen also assists healthcare clients in developing environmental infection control sampling strategies after infection outbreaks, during construction and renovation projects, and following major facility events (e.g., flooding, sewage contamination, etc.) Mr. Goguen holds a Masters degree in Environmental Policy and Management from the University of Denver and has held many EHS management positions in fortune 500 corporations for over 30 years.

9:00 – 9:55: Medical Gas Systems for Healthcare Based Facilities. (Med Gas 101)

This presentation will discuss the evolution of the need for medical gas systems, design concepts and code compliance issues. In addition, project coordination with the various trades, (mechanical and controls contractors) will be addressed along with issues of verification and commissioning.
Speaker: R. Scott Jussel, is the President and Founder of Medical Air Systems, Inc. and Medical Air Testing & Service, Inc. He started in the hospital air compressor & vacuum pump industry in 1972 with Ingersoll-Rand Co. as a parts clerk, serviceman, service manager, and sales engineer. He founded Medical Air Systems in 1985. Scott is a Charter member of Medical Gas Professional Healthcare Organization (MGPHO), an organization comprised of 228 verifiers in the U.S. and Canada. He has been on the MGPHO Board of Directors for 2 terms (2007 thru present), is a member of the Colorado Association of Hospital Engineers and Directors (CAHED) since 1985 and is currently in his second term on the CAHED Board of Directors. He is a 2-time winner of CAHED Vendor of the Year Award.

10:10 – 11:05: Patient Room Air Distribution Using Displacement Ventilation or Active Chilled Beams

The type of air distribution used in patient rooms will have an impact on the operating cost of the hospital. This presentation explores two recently approved addenda to ASHRAE Standard 170 Ventilation of Health Care Facilities. Addendum G addresses the use of displacement ventilation and addendum H addresses the use of Active Chilled Beams in single occupancy patient rooms. The basic functionality of these two types of air distribution are explored as well as compared to overhead mixing. Air borne contaminant will be discussed for both methods of air distribution.
Speaker: Jerry Sipes is the Vice President of Engineering for Price Industries and is a Professional Engineer with more than twenty years of experience in the HVAC field. He has a Ph.D. in Mechanical Engineering and his technical areas of interest are heat transfer, fluid flow, human thermal comfort, HVAC and acoustics. He serves at the national level of ASHRAE, AHRI and USGBC. At AHRI, he is the past chairman of the Air Control and Distribution Devices (ACDD) Section, the chairman of the ACDD and Chilled Beams engineering committees, member of the AHRI Compliance Committee and is the chairman of the ARHI Standard 1240P, Performance Rating of Active Chilled Beam Units. At ASHRAE,

he is the vice chairman of ASHRAE Technical Committee 5.3 Room Air Distribution, chairman of Standard 200, Method of Testing for Chilled Beams, member of Standard 79, and past chairman of Standard 130, Methods of Testing for Rating Ducted Air Terminal Units.

1:35 – 2:30: Effective Operating Room Air Distribution Design Procedures

Appropriate selection and application of air distribution devices is an important component of any well designed project, but is especially critical when it comes to operating room air distribution systems. We will discuss codes and standards that relate to operating room air distribution system selection and various approaches to achieving optimal airflow conditions in the OR.

Speaker: Mindy Espinosa began her HVAC career with LONG Building Environments in 2001. She received a BS from the University of Utah in 2005. After working with contractors, engineers, and owners as a Sales Engineer for LONG Building Environments in Salt Lake City Utah, Mindy re-located to Richardson Texas to join the sales management team for Krueger. In addition to attending local ASHRAE chapter meetings and functions, she enjoys participating in ASHRAE events around the country.

2:35-3:30: Benefits and Applications of Venturi Valves in Healthcare

This presentation will focus on the application of venturi valves in healthcare design. The current issues affecting HVAC in hospitals will be discussed including the need for pressurization and directional airflow control and how venturi valves can increase operational efficiency and reduce energy consumption.

Speaker: Cheryl Laniewicz specializes in critical care environments in her current role as Sales Manager for U.S. Healthcare National Accounts with Phoenix Controls. Her background includes 9 years of HVAC industry experience with over 20 years of technical sales and specification design assist experience in the healthcare, laboratory and research industries. Ms. Laniewicz is a current member of ASHE, CAHED, HESNI, HESGNY, and IFMA. She frequently speaks on topics related to HVAC ventilation in the areas of: Sustainability, Energy, Codes, Emergency Preparedness, Airborne Infection Control and Healthcare Construction Design Trends.

Dan Prusia currently holds the position of Regional Sales Manager in the West/Mid-west region for Phoenix Controls. Prior to his current position, Dan has held leadership positions at Invensys (Schneider) and SPX Corp contributing to his 35 years of HVAC industry experience. His background also includes technical support, sales engineering and management at various contracting, distribution and manufacturing levels throughout his career. Dan holds a degree of Bachelors of Arts in Management from Saint Mary's College of California and has been affiliated with ASHRAE, RSES and CSHE.

3:35-4:30: Commissioning of Healthcare Facilities

Healthcare facilities present special problems and consideration for both system design and commissioning. This presentation will focus on the differences and special needs presented by healthcare institutions to the designer and the commissioning agent including such issues as infection control, build clean, owner furnished equipment, space pressurization, USP 797 pharmacy clean rooms, biohazard exhaust and mission critical operation among others. In addition, key communication elements for building owners and operators will be discussed.

Speaker: Lisa Doughty is a Senior Project Engineer with Engineering Economics, Inc. and has been an HVAC engineer since the late 1980s. She began her HVAC engineering career as a test and balance field engineer working in pharmaceutical clean environments. This introduction was followed by a decade as a design engineer, including design build work in laboratories and clean rooms. She has worked in commissioning since 2001, and focused on Healthcare commissioning, facility assessment / planning and retro-commissioning for most of that time.

ROCKY MOUNTAIN CHAPTER OF AMERICAN SOCIETY OF HEATING, REFRIGERATION & AIR-CONDITIONING ENGINEERS

21st Annual Technical Conference

Certificate of Attendance

Sponsored by the Rocky Mountain Chapter of ASHRAE

April 19, 2013

HVAC&R Fundamentals	HVAC Systems & Applications	Sustainability	Building Automation	Healthcare
Basics of Evaporative Cooling Design Rick Phillips, The RMH Group, Inc.	**Air Distribution in Large Open Spaces** Jerry Sipes, Price Industries	**Examples of Commercial Scale GSHP System Performance** Terry Proffer, CGDE	**DDC Basics** Dave Kahn, The RMH Group, Inc.	**Air and Water Sampling Techniques supporting Healthcare EIC Programs** Art Goguen, Higgens and Associates
Control Valve Authority and Pressure Independent Systems Hailey Mick	**HVAC Centrigugal Pumps** Mark Jelinske, Cator Ruma & Associates	**Data Center Retrofit: 90% Energy Use Reduction on a Budget** Rick Osbaugh, The RMH Group, Inc. David Gallaher, NSIDC Otto Van Geet, NREL	**Complex & Effective Control Sequences** Erik Jeannette, Eaton Energy Services	**Medical Gas Systems for Healthcare Based Facilities** R. Scott Jussel, Medical Air Systems
Basic Fan Selection for LEED and Sustainable Design Jerry Kiel, Lockheed Martin	**Variable Refrigerant Flow Systems** Ken Urbanek, MKK Consulting Engineers	**Energy Recovery: Saving Energy in Industrial Applications** Juan Moreno, Eaton Energy Solutions	**Practical and Energy Efficient Approaches to Ventilation** Jarrell Wenger, Engineering Economics, Inc.	**Patient Room Air Distribution using Displacement Ventilation or Active Chilled Beams** Jerry Sipes, Price Industries
Altitude Effects on System Design Michael Haughey, Silvertip Integrated Engineering Consultants	**Performance Metrics for Physical Water Treatment Systems** Michael Patton, Griswold Water Systems	**Water Efficiency in Commercial Buildings** Cindy Moe, Denver Water	**EMS, Software Audit Tools, and other Efficiency Technologies** Mary Horsey, E Source	**Effective Operating Room Air Distribution Design Procedures** Mindy Espinosa, Krueger
Psychrometrics James Murphy, Long Building Technologies	**Evaporative Condensers** Ilana Cember, Baltimore Air Coil	**Introduction to Open Studio, a Development Platform for Building Energy Modeling** Larry Brackney, NREL Andrew Parker, NREL	**DDC Controls Best Installation Practices** Rob Lents, ATS Rocky Mountain	**Benefits and Applications fo Venturi Valves in Healthcare** Cheryl Laniewicz, Phoenix Controls
Energy Use in Refrigeration Systems Scott Martin, Integrated Building Solutions	**Indirect Evaporative Cooling Applications** Michael Haughey, Silvertip Integrated Engineering Consultants	**Displacement Ventilation: Design Considerations, Operational Advantages and Case Studies** Barry Stamp, Shaffer-Baucom Engineering & Consulting	**Utilizing the BAS for Monitoring & Validation Procedures** Steven Meyer, PCD Engineering	**Commissioning of Healthcare Facilities** Lisa Doughty, Engineering Economics, Inc.
				Keynote Speaker: The Future of our Industry and ASHRAE's Role Timothy Wentz, ASHRAE Vice-President

_____

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 FORM

21st Annual Technical Conference
Friday, April 19, 2013
Sheraton Hotel Denver West – 360 Union Boulevard, Lakewood CO 80228

"Broadening ASHRAE's Horizons"

Presented by:

The ASHRAE Rocky Mountain Chapter

Register by April 5th, 2013 to ensure space availability.

Checks received after April 5th or walk-ins the day of the seminar will be accommodated pending space availability.

Please photocopy this form for additional attendees and for your records.

Individual Registration:
Your Name_____Title_____
Company_____
Mailing Address_____
Phone_____Fax_____

Company Registration:
Company_____
Mailing Address_____
Phone_____Fax_____

Seminar Preference: (This is for space allocation only. You may attend any seminar during the conference.)
Check Your First and Second Preference

- ☐ **HVACR Fundamentals**
- ☐ **HVACR Systems & Applications**
- ☐ **Sustainability**
- ☐ **Building Automation**
- ☐ **Healthcare**

Are you a Member of ASHRAE USGBC CAHED AIA AIHA BOMA Other_____

Please register me for...

Please register my company for... _____ **passes.** 10% Discount for 5 or more Company Passes if Registered before April 6th.

Check Your Preference

Full day @ $175.00, (Lunch included), (Total Number)_____
1/2 day at $125.00, (Lunch included), (Total Number)_____
☐ Morning Session ☐ Afternoon Session

Late Registration, received after April 5, 2013, will be:
$190.00, (includes lunch), $150.00 1/2 day, (includes lunch)

Enclosed please find a check for: $_____
Please Make Checks payable to Rocky Mountain Chapter ASHRAE

Payments with Master Card or Visa can be made at the Chapter's Website: www.rockymtnashrae.com

Credit Cards can be used the day of the Conference for a 2.75% fee

Please mail check and registration form to:

Megan Van Wieren
143 Union Blvd. Suite 350
Lakewood, CO 80228
Phone: 303-974-1230
e-mail: meganlvanwieren@eaton.com

For questions please contact:
Jon Rundquist, 303-428-2800 or TechConference@rockymtnashrae.com