

This year's Technical Conference theme is "Extending our Community". Our Keynote Speaker this year is ASHRAE President Bjarne Oleson, Ph D., Fellow ASHRAE. He will be speaking on "Extending our Community", his Presidential theme, which focuses on extending our global community, extending our technological horizons, and extending ASHRAE's value to its members.

In addition, we would like to thank Chris Edmondson for speaking at this year's event on minimizing energy usage and maximizing performance for pumps. Chris is an ASHRAE Distinguished Lecturer. He has been involved with ASHRAE for over 30 years, mostly at the local and Regional level and an approved instructor for many USGBC GBCI LEED presentations.

This is the 26<sup>th</sup> annual ASHRAE Rocky Mountain Chapter Technical Conference. The chapter prides itself on providing quality speakers and presentations to the HVAC&R community. 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 educate both experienced and novice engineers. We will be providing PDHs and CEUs as usual, as well as GBCI credits for many of the sessions.

# Thank-you:

This event has been ongoing for 26 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:**

- Baily Anderson Air Purification Company Tony Anderson – AMI Mechanical Trevor Bromberg – McGrath Kate DuMez – Group 14 Laura Dyas – Group 14 Sara Frame – Western Mechanical Solutions Mike Fulton – Western Mechanical Solutions Larry Gelin – CFM Company Ira Goldschmidt – Goldschmidt Engineering Scott Jones – Air Purification Company Brian Lynch – Western Mechanical Solutions
- Cara Main CFM Company Bill Mele – Chemistry & Industrial Hygiene Eugene Mitchell – McNevin Co. Erica Moser – RMH Group Ken Nekvasil – ATS Rocky Mountain Nathan Ralphe – Engineered Aire Taylor Reese – 360 Engineering Matt Ryon – CFM Company Kaitlyn Sporleder – Air Purification Company John Stumpf – LONG Building Solutions Michelle Swanson – 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 the speakers. Without everyone's support, this conference would not be possible.

Thank You,

Them J. Browberg

Trevor Bromberg, Committee Chair

7:30-8:00	Registration					
Tracks	HVAC&R Fundamentals	HVAC&R Systems & Applications	Sustainability	DDC	Critical Environments	
Sponsor:	Western Mechanical Solutions	CFM Company	McNevin Company	ATS	Air Purification	
8:00-8:55	<i>Pumping System</i> Mark Jelinske, The RMH Group	Design, Application, and Energy Savings in Water-Side Economizers Steve Kline, PE, Baltimore Air Coil; Gene Krist, PE, CFM Company	Refrigerants and their Applications Thomas E. Watson, PE, Daikin Applied	<b>VFD's, What Can You Do</b> with Them? Mike Harris, Honeywell	Using Active Chilled Beams to Reduce or Eliminate Reheat Nick Searle, Titus HVAC	
9:00-9:55	ASHRAE Standard 90.1 Sean Beilman, PE, BCER Engineering	VAV Terminal Application and Design for K-12 Applications Jerry Bivens, PE, Envision Mechanical Engineers	Building Enclosure Commissioning (BECx) Jeff Crowe, PE, Pie Consulting & Engineering	A Simplified Approach to Specifying Interoperability Jeff Lucas, DRA	Textile Air Dispersion in Cultivation Facilities Andrew Sorenson, Prihoda North America	
9:55-10:25	Morning Break & Vendor Exhibits					
10:25-11:20	<i>Altitude Effects on System</i> <i>Design</i> Michael Haughey, PE, Silvertip Integrated Engineering Consultants	Fundamentals of Variable Speed Pumping Control Systems Using Modern Technologies Brent Ross, PE, Armstrong Fluid Technology	Lessons Learned from LEED v4 Taylor Roberts, PE; Pachia Moua; Laura Unrein, Group 14 Engineering	<b>DDC Basics</b> Mike Harrington, CFM Company	Applying Needlepoint Cold Plasma in Commercial Applications Charles Waddell, Global Plasma Solutions	
11:25-12:50	Lunch Break and KeynoteExtending Our Community: Global Community, Technological Horizons and Value to Members Bjarne Olesen, PhD, ASHRAE President					
12:50-1:15	Vendor Exhibits					
1:15-2:10	<b>Psychrometrics</b> Michael Fulton PE, Western Mechanical Solutions	Risk Reduction in Pool Room and Natatorium Design Keith Coursin, Desert Aire	WELL and Kitchen Energy Efficiency Opportunities Loretta Pokorny, Energetics Consulting Engineers	<b>Dual Sourcing Controls</b> Ken Nekvasil, ATS Rocky Mountain	Life Safety Impacts on Laboratory and Healthcare Design Mark Jelinske, The RMH Group	
2:10-2:30		Afternoon Break & Vendor Exhibits				
2:30-3:25	<i>Fan Fundamentals</i> Ryan Johnson, Air Purification Company	Don't Let This Happen To You! Michael Fulton, PE, Western Mechanical Solutions; Larry Gelin, CFM Company	Green Roof Initiative Scott V. Prisco, City and County of Denver; Andy Creath	Understanding What BACnet Is and Isn't Ken Nekvasil, ATS Rocky Mountain	Microgrids: What they mean for the Engineer Jeff Elsner, The RMH Group	
3:30-5:00	Afternoon TechnicalSelecting Pumps for Ultimate Owner SatisfactionKeynote AddressJ. Chris Edmondson, ASHRAE Distinguished Lecturer					

### 2018 Rocky Mountain Chapter ASHRAE Technical Conference "Expanding Our Community"

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

# ASHRAE Rocky Mountain Chapter

# ADAPT TODAY TO SHAPE TOMORROW

## For Whom:

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

### When & Where:

Friday, May 11<sup>th</sup>, 8am to 5pm at the: Sheraton Denver West Hotel 360 Union Blvd. Lakewood, CO 80228

## Professional Development Hours (PDH):

Twenty-Seven PDH sessions to choose from and the fourteen sessions eligible for GBCI credit are indicated on the Certificate of Attendance. If you would like GBCI credit, please sign the attendance sheet located in each session. In addition to signing in, credits must be self-reported to GBCI.

## Your Cost:

#### Prices before April 27th @ 5p

Member ½ day:\$ 150(lunch included)Member Full day:\$ 200(lunch included)Non-Member ½ day:\$ 175(lunch included)Non-Member Full day:\$ 220(lunch included)(10% discount to companies sending 5 or more)

#### Prices After April 27th @ 5p

Register at <u>www.rockymtnashrae.com</u>						
(10% discount to companies sending 5 or more)						
Non-Member Full day	:\$ 240	(lunch included)				
Non-Member ½ day:	\$ 195	(lunch included)				
Member Full day:	\$ 220	(lunch included)				
Member ½ day:	\$ 175	(lunch included)				

#### Prices Day of Event

½ day:	\$ 195	(lunch included)
Full day:	\$ 240	(lunch included)

# Thank-you:

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



**Rocky Mountain** 





COLORADO

Western Mechanical Solutions

SUSTAINABLE HEATING COOLING







#### Luncheon Keynote Address:

#### "Extending Our Community: Global Community, Technological Horizons, and Value to Members"

Extending our global community will acknowledge our interconnectedness worldwide and embrace our shared needs and objectives. The technical guidance we produce for all members is made stronger by global diversity. Many of our members are only active on one side – either the technical side, mainly at the Society level, or the grassroots side at the local chapter level. However, one side cannot live without the other. We will work to extend our global connections and more strongly link our members worldwide. Doing so will strengthen our Society's knowledge base, community reach and ability to shape a more sustainable world.



Speaker: Bjarne Olesen, Ph.D., 2017-2018 ASHRAE President; Bjarne Olesen, Ph.D., Fellow ASHRAE, is ASHRAE's President for the 2017-2018 term. Olesen has previously served on the Board of Directors as Treasurer, Vice President and Director-at-Large. Olesen is the Director of the International Center for Indoor Environment and Energy and a Professor at Danish Technical University.

In addition to his time served on the Board of Directors, Olesen has been a part of many technical committees and been a Coordinating Officer of various committees, most recently: Conferences and Expositions Committee, Chapter Technology Transfer Committee, Honors and Awards Committee, Grassroots Government Advocacy Committee, Membership Promotion Committee, Research Promotion Committee, Student Activities Committee and Young Engineers in ASHRAE Committee.

For his efforts and dedication to ASHRAE, Olesen is the recipient of the Lou Flagg Historical Award, Fellow Award, Exceptional Service Award and Distinguished Service Award.

Olesen earned his Ph.D. in Heating and Air Conditioning in 1975 and Master of Science in Civil Engineering in 1972 – both degrees obtained from the Technical University of Denmark.

Sponsored by:



#### Afternoon Technical Keynote and Open Bar:

#### "Selecting Pumps for Ultimate Owner Satisfaction" (Advanced Pumping and Selection)

There is a fundamental shift in the way we design, construct, maintain and operate a building being driven by ASHRAE Standards becoming code, DOE Efficiency Mandates and Hydraulic Institute piping guidelines. The Owners are expecting us to still provide pumping systems that satisfy their demands for the Best LCC Pump Life Expectance, the best System Efficiency Operating Cost and other needs.

This presentation will examine a few of the key design decisions and their impact on the owner's true requirements.

**Speaker: J. Chris Edmondson, ASHRAE Distinguished Lecturer**; Chris Edmondson received his B.S. Degree in Mechanical Engineering from North Carolina State University in 1967. During his summers, he worked at Barber Coleman and Jay Johnson Controls. After graduation, he spent four and a half years as a salesman with the Trane Company. In 1971, he came to work for the James M. Pleasants Co., Inc. (Manufacturer's Representative for the ITT Fluid Handling Division) He worked as an Outside Salesman until 1978, when he was promoted to Vice President and Sales Manager till 1987. From 1987 to 2010, he has served as President of the Pleasants Company. Chris is currently CEO of James M. Pleasants Company.



Chris has served many years in the ASHRAE organization, holding positions such as Secretary/Treasurer, Vice President and President of the North Piedmont Chapter. For the fiscal year, 1985-86, Chris received the Rudy Ferguson Memorial Award (Presidential Award of Excellence). In 1985, he became a Technical Speaker to various ASHRAE chapters and he is a Distinguished Lecturer for ASHRAE. He spoke at ASHRAE's CRC Region VII meeting in 1992, Region III CRC Technical Speaker 2013 Bethlehem PA, ASHRAE 2014 NYC lecture series, ASHRAE Region IV CRC 2015 Raleigh NC, Birmingham's Region VII Meeting and many other ASHRAE events as a Technical Speaker. He held the position of Educational Activities Vice Chairman for Region IV from 1992 to 1994. In 1995 he was the Chapter Program Chairman for Region IV. He has served as Region IV DRC and on the ASHRAE Board of Directors. He has also served on the ASHRAE nominating committee. He is also an approved instructor on many USGBC GBCI LEED Presentations.

Sponsored by:



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

# TRACK 1 – HVAC&R FUNDAMENTALS

### Sponsored by: Western Mechanical Solutions



Western Mechanical Solutions SUSTAINABLE HEATING COOLING

### 8:00 -8:55: Pumping Systems

This presentation will discuss basics of pumping systems: energy impacts of pumps; basic pump types; pump selection including typical pump curves, NPSH and cavitation, pipe sizing; pump operation including parallel pumps and variable speed pumps; and effects of glycol.

**Speaker**: Mark Jelinske, P.E., Chief Engineer @ The RMH Group; Mark has over 30 years of engineering experience, primarily as a consulting engineer, as well as a project engineer for a large mechanical contractor. He has been providing training and mentoring in house and at technical conferences for at least 15 years. He is a registered Professional Engineer in Mechanical Engineering and Fire Protection Engineering. He is active in the development process for several model codes, NFPA standards, and the FGI Guidelines. He has been designated as the ASHE Code Advocacy Liaison for Colorado, and serves on the Denver Building and Fire Code Task Force for the 2016 Denver Code Amendments. He has a Bachelor of Science degree from the University of Missouri- Rolla (Missouri University of Science and Technology).

### 9:00 - 9:55: ASHRAE Standard 90.1

ASHRAE Standard 90.1 – 2013 was released in the fall of 2013 and is referenced by IECC 2015. The Mechanical Chapter, Section 6 of 90.1 - 2013 includes roughly 40 changes to 90.1 – 2010. These changes help reduce energy consumption by changing the minimum HVAC requirements and further broadening the scope of the standard. This presentation will cover some of the major changes to the Mechanical Chapter of the standard that will affect mechanical engineers.

**Speaker**: Sean Beilman, PE, Associate Principal and Manager of Energy Services @ BCER Engineering; Mr. Beilman has over 15 years of experience in the design of HVAC and plumbing systems for governmental and educational facilities, office buildings, resorts, healthcare, and data centers. Mr. Beilman's area of expertise is high performance buildings, energy efficiency, and sustainable building design. Beilman served as the Rocky Mountain ASHRAE Sustainable Engineering Committee Chairman from 2009 to 2010 and is one of the co-founders of the Rocky Mountain Energy Simulation Engineers group. Currently he is a Voting Member of the ASHRAE Standard 90.1 Project Committee, a member of the ASHRAE Advanced Energy Standards working group, and served as the Technical Editor of the ASHRAE Standard 90.1, 2013 User's Manual.

# 10:25 – 11:20: 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, Principal @ Silvertip Integrated Engineering; Michael has 40 years' experience in HVAC & Mechanical consulting, facilities engineering, energy analysis, systems commissioning, systems troubleshooting, and sustainability consulting. His roles have included Past President of the 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, and past adjunct professor, HVAC Design, CU Denver and CU Boulder. He specializes in alternative and energy-conserving systems such as indirectdirect 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. He has developed and presented over 60 seminars.

## 1:15 – 2:10: 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 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 28 years of 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.

### 2:30 – 3:25: 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, Air Purification Company; Ryan Johnson has 18 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 commercial fans and blowers, but he has also supported specific market segments such as laboratory exhaust systems, agricultural processes and mine / tunnel ventilation.

# TRACK 2 – HVAC&R SYSTEMS & APPLICATIONS

Sponsored by: CFM Company



# 8:00 – 8:55: Design, Application, and Energy Savings in Water-Side Economizers

Steve Kline and Gene Krist will present the practical and standards-driven (ASHRAE 90.1 and 189.1) requirements for application of water-side economizers. The heat rejection device, often a cooling tower or an evaporative fluid cooler, can be used in either a heat exchanger application or in an application with secondary cooling coils for heat pumps, air handlers, or other cooling terminals. Participants will learn how to determine the performance of a heat rejection device, the available hours throughout the year where water-side economizer will adequately perform, some of the typical cost and performance trade-offs between different strategies, and pitfalls to avoid in selecting the pieces of equipment.

**Speaker**: Steve Kline, P.E., National Sales Manager @ <u>Baltimore Aircoil Company (BAC)</u>: Steve is a registered Professional Engineer in the State of Maryland and past chair of ASHRAE Technical Committee 8.6 - Cooling Towers & Evaporative Condensers. Steve has more than 20 years of experience with BAC, primarily focused on product applications, project management, and sales management. Prior to joining BAC, Steve was a consulting engineer in the Baltimore area for three years. Steve holds a BSME from Bucknell University, as well as an MSME and MBA from Johns Hopkins University.

**Speaker**: Gene Krist, P.E., President @ CFM Company: Gene began working in the HVAC industry in 1978 as a summer intern with a local MEP Consultant. He graduated from the Colorado School of Mines with a with a B.S. degree in Chemical Engineering and has worked as a consulting engineer, a manufacturer's representative, and with a manufacturer/integrator of custom controls and pumping systems. He is a member of ASHRAE and has previously presented as a speaker for the ASHRAE Professional Development Series.

# 9:00 – 9:55: VAV Terminal Application and Design for K-12 Applications

Jerry Bivens will present a review of single duct terminal unit applications and selections. Highlights will include unit selections for cooling only, hot water reheat, and electric reheat applications. He will review how terminal units are selected based on building load calculations, minimum static pressures at inlets, when to make terminal size changes to meet specific project requirements, discharge air temperatures, and sound requirements for a K-12 application. Finally, he will concentrate on the challenges presented when utilizing single duct terminal units when applications include minimum ventilation rates, demand controlled ventilation, heating water reset, discharge air temperature reset, and minimum electric heating airflows.

**Speaker**: Jerry Bivens, P.E, LEED AP, Associate @ Envision <u>Mechanical Engineers</u>: Jerry has been in the consulting engineering field for over 25 years and is registered as a Professional Engineer 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 HVAC design, including medical facilities (hospital, MOB, and surgery centers), clean rooms, laboratories, office buildings. He has over 15 years of design experience in the K-12 school market.

## 10:25 – 11:20: Fundamentals of Variable Speed Pumping Control Systems Using Modern Technologies

The fundamentals of a variable speed pumping system are described, along with control and measurement components. The ability of an engineer to maximize energy savings through proper system design and component selection is reviewed in great detail. The presentation will include variable speed system descriptions with and without zone dP sensors, operating characteristics of parallel and single pump systems, selection strategies to maximize efficiency and minimize capital cost, and an analysis of impeller sizing in order to maximize pump efficiency.

**Speaker**: Brent Ross, P.E., Global Director of Core and <u>Hydronic Solutions @ Armstrong Fluid Technology</u>: Brent is a graduate of University of Toronto in Mechanical Engineering and has a Master's of Business Administration from York University in Toronto. During his 25 year career with Armstrong Fluid Technology he has headed sales, marketing and engineering departments and divisions which have developed and produced many innovative energy efficient solutions for HVAC systems. He has been Vice Chairman of ASHRAE TC 8:10 Pumps and Hydronic Systems and co chairman of The Hydraulic Institute / Pump Systems Matter committee for Utility Energy Rebate & Incentive Development. Currently he sits on the Board of Directors of Hydraulic Institute committees and is the Company's Executive voting member for Hydraulic Institute.

# 1:15 – 2:10: Risk Reduction in Pool Room and Natatorium Design

Keith Coursin will be speaking on the key elements of a proper pool room design including the fundamentals of determining the moisture load, the effects of the swimmer activity factor, the consequences of airflow across the pool water surface, dew point control, and the proper design of a vapor barrier. He will also be discussing the latest recommendations by both ASHRAE and the Center for Disease Control for treating the toxic gasses found in indoor pool environments. Finally, he will discuss the importance of proper refrigeration design within a dehumidifier and line sets for remote condensers.

**Speaker**: Keith Coursin, President @ Desert Aire LLC: In addition to his duties at Desert Aire, Coursin served in 2009 as chairman of the board of directors of the Air Conditioning, Heating, & Refrigeration Institute (AHRI). He has also served on numerous AHRI committees. Coursin participated in key indoor pool industry efforts including development of the CDC's Model Aquatic Health Code as well as ANSI/ACCA standards detailed in HVAC Design for Swimming Pools & Spas (Manual SPS) and is an ASHRAE member.

### 2:30 – 3:25: Don't Let This Happen To You!

An unfortunate part of engineering and construction is learning lessons the hard way. Mike Fulton and Larry Gelin will present lessons learned from an engineering, practical and financial standpoint in order to help engineers prevent problems as they start to tackle the design of complex equipment. Mike and Larry will present four to five topics each, including but not limited to:

-Preventing risk of fan surge and explosion by properly accounting for filter loading and safety factor

-Ensuring proper operation of gas burners installed indoors -Prevent fan motor "Oh S\*\*t!" Moments by understanding BHP derate with direct drive fans

-Proper selection and design of airflow sensors for VAV terminal and outside airflow measurement systems

-How missing whole-building airflow balance can make your life a living hell

-What not to do when specifying vibration isolation systems

**Speaker**: Michael Fulton, P.E., Western Mechanical Solutions: Michael 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 27 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, and has been on the ASHRAE Research Promotions committee that has set records for the past 5 years.

**Speaker**: Larry Gelin, Manager of End User Sales @ CFM <u>Company</u>: Larry has been working at CFM Company for 15 years. He holds a BSME from the University of Wisconsin at Madison and a MSME from the University of Texas at Austin, with extensive experience in acoustics, vibration, and noise control. Larry is a past Director of Rocky Mountain ASHRAE and has been involved in the ASHRAE Tech Conference since 2002. He has delivered presentations to the ASHRAE community on pumping systems, vibration isolation, seismic and wind restraint, public speaking and management.

# Track 3 – SUSTAINABILITY

#### Sponsored by: McNevin Company



#### 8:00 – 8:55: Refrigerants and their Application

Conversations about sustainable buildings typically focus on the need for water and energy efficiency and green building materials. Equally important in the move toward sustainability is the need to reduce the impact of refrigerants on the environment. This presentation provides a brief history of refrigerants, their basic chemistry and their properties. The emphasis on what determines the types of applications are most suitable, including compression technology, heat exchanger design and service procedures. Alternative refrigerants with a focus on potential refrigerants for the future are discussed, noting that safety concerns and environmental issues need to be balanced. Refrigeration system efficiency is also discussed in the context of the environmental issues.

Speaker: Thomas E. Watson, P.E., ASHRAE Fellow, Daikin Applied; Tom Watson currently is an engineering consultant to Daikin Applied and spent 17 years as Chief Engineer, involved in Global New Product Development supporting facilities in China, Japan, Italy and North America for Daikin Applied. Tom has held various leadership positions in ASHRAE, including president from 2012-2013, and recently chair of the committee writing ASHRAE's Standard 188, Prevention of Legionellosis Associated with Building Water Systems. As a licensed professional engineer in the commonwealth of Virginia, Tom holds five patents related to refrigerant, gas and chiller compressors. He has received numerous awards throughout his career, including the ASHRAE Standards Achievement Award in 2004, ASHRAE Exceptional Service Award in 2010, and the F. Paul Anderson Award in 2016 which is ASHRAE's highest technical award. In 2017 he was awarded the Institute of Refrigeration's J & E Hall Gold Medal for ground breaking work on improving the efficiency of chillers and industrial heat pumps.

### 9:00 – 9:55: Building Enclosure Commissioning (BECx): Defining and Understanding the Process

More and more frequently Building Enclosure Commissioning (BECx) is being included in project specifications or required by authorities having jurisdiction. Yet, the definition, scope, and purpose of BECx is largely undefined and rarely understood. This session will examine the current state of BECx though a review of the process and an examination as to its incorporation in codes and industry recognized guidelines. For those interested in understanding and including BECx as a project requirement, this session will present broad options for implementing BECx or including BECx in project specifications.

**Speaker**: Jeff Crowe, P.E., BECxP, FMPC, Pie Consulting & Engineering; Jeff Crowe is a Senior Project Manager with Pie Consulting & Engineering experienced with building envelope consulting, building science, and envelope performance testing. Jeff has 10 years' experience in enclosure consulting and testing and has been involved with building enclosure commissioning on projects both large and small.

#### 10:25-11:20: Lessons Learned from LEED v4

LEED v4 introduces new concepts and credit requirements. With several projects underway, we will outline the new requirements, cover lessons learned from LEED v4 reviewer comments, and discuss how the mechanical, electrical and plumbing scope have expanded to meet the new requirements. We will compare LEED v4 to the newest building codes and what, if any, changes we can expect with upcoming LEED v4.1. We will have an expert energy modeler and lighting commissioning agent on hand to address MEP related concepts.

**Speaker**: Taylor Roberts, PE, LEED AP, Building Performance Engineer @ Group14 Engineering: Taylor has over five years of experience in the building energy field with expertise in energy analysis and optimization. Taylor manages complex projects including higher education, healthcare, class A office buildings and municipal work. Taylor has presented at IBPSA, RMAEE, and ASHRAE Building Simulation conference on topics relating to building energy efficiency and simulation. **Speaker**: Pachia Moua, LC, Lighting Analysis and Lighting Commissioning Agent @ Group14 Engineering: Pachia has over eight years of experience in electric lighting, lighting controls, and daylighting design/analysis and building energy optimization as well as building energy analysis. She is an expert in AG132 illumination engineering software. From new building lighting analysis to retrofits of electric lighting and control systems, Pachia has worked on higher education campuses, hospitals, medical office buildings, recreation centers, and K-12 schools. Her latest presentation for IBPSA addressed integrating a lighting expert into building energy modeling.

**Speaker**: Laura Unrein, MS, LEED AP BD+C, Sustainable Design Consultant @ Group14 Engineering: Laura has over six years of experience in the sustainable design arena including expertise with building energy analytics, healthy building research, sustainable rating systems including LEED and WELL. Her work includes higher education campuses, airports, labs, and libraries. Laura has presented on the WELL building standard for the American Institute of architecture.

### 1:15 – 2:10: WELL and Kitchen Energy Efficiency Opportunities

The intent of the WELL Building Standard (WELL) is to improve health and wellness of individuals within the built environment by laying the ground work for improved internal processes, creative infrastructure design and energy efficiency opportunities. This session will include discussion of a variety of energy efficiency measures that may be implemented within commercial kitchens. Commercial kitchens are high energy users, consuming roughly 2.5 times more energy per square foot than any other commercial space, according to the EPA. We will be discussing building envelope, lighting, electric/gas equipment, and HVAC equipment. Energy Star case studies will be presented.

**Speaker**: Loretta Pokorny, Project Manager @ Energetics <u>Consulting Engineers</u>: Loretta radiates her personal devotion and commitment for energy efficiency and sustainability throughout every project. She has a strong belief that energy and sustainability policies have a significant positive impact on buildings, people and the environment. She has 19 years combined experience in energy efficiency consulting and HVAC design. Her practical experience in design and personal interest in energy and sustainability led her to energy efficiency consulting. Prior to joining Energetics, she spent the bulk of her career working closely with utility clients locally and nationally.

### 2:30 - 3:25: Green Roof Initiative

This past fall, Denver voters approved the Denver Green Roof Initiative, which will require buildings over 25,000sqft to dedicate a percentage of the building's roof to green, vegetative space at the time of construction or at the time of normal replacement. The Green Roof ordinance is intended to encourage better storm water management, reduce heat island effect, reduce energy cost, increase roof life expectancy, and beautify the city. Scott is part of the Green Roofs Review Task Force and will be sharing some background on the initiative and what it will look like when the ordinance goes into effect. Andy will provide an overview of the green roof design and construction processes.

**Speaker**: Scott V. Prisco, Engineer/Architect Director/Building Official for the City and County of Denver: Scott's career has spanned the public and private sides of development, design and construction. A LEED-accredited registered architect, Scott most recently served as director of design and construction for Arlington (VA) Public Schools, heading up the district's ambitious capital improvement program. Prior to that, Scott owned an architecture firm in New Jersey and has designed myriad buildings including the Microsoft School of the Future in Philadelphia.

Speaker: Andy Creath, Entrepreneur in the Environmental and Sustainability Fields: Andy founded Green Roofs of Colorado, a green roof design, installation, maintenance, and consultation He is a board member for the Green company in 2006. Infrastructure Foundation, which was founded in 2007 to respond to the need for greater awareness and resources to promote green infrastructure in local communities. He was an integral part of the successful Denver Green Roof Initiative as a Technical Advisor and Spokesperson. He Co-chairs the Green Roofs for Healthy Cities Maintenance committee, and was integral in writing the maintenance course which is a required course for the Green Roof Professional Designation. He worked for four years at the U.S. Environmental Protection Agency (EPA) as a program analyst within the Office of the Inspector General. Andy and his work has been featured in Dwell, Building Magazine, Living Architecture Monitor, and the Denver Post.

# Track 4 – Building Automation

#### Sponsored by: ATS



# 8:00 – 8:55: VFD's, What Can You Do with Them?

This session will start with a general overview of how a drive works. Other topics to be covered will include harmonics, bypass or not, use in smoke control applications and a discussion on some of the other unique things you can do with a VFD.

#### Speaker: Mark Harris, Honeywell;

Rich Knapp is a 28 year Honeyweller with extensive product and service field sales experience. For the past 8 years Rich has been a Field Device Specialist concentrating in valves/actuators, and variable frequency drives. Prior to this, he was a trade sales representative specializing in commercial products for distribution accounts and he sold system retrofits and performance contracts to the commercial market. He holds General Engineering degree from The United States Military Academy at West Point, N.Y.

# 9:00 – 9:55: A Simplified Approach to Specifying Interoperability

Today's building automation systems are becoming more complex. Interoperability between manufacturers package controls and building automation systems has become the standard. This trend has come with several challenges including how to best specify interoperability. This presentation will explore current specification strategies and offer proven simplified processes to help ensure successful building automation projects.

**Speaker**: Jeff Lucas, CEM, CEA, LEED AP, DR Associates; Jeff Lucas is an Account Executive at DR Associates. Over his 23 years in the building automation industry he has served in several roles including end user, operations and sales. Jeff is well versed in large scale BACnet integrations and his work has been featured in the ASHRAE Journal's BACnet Today. Jeff is well versed in BAS integrations with various protocols. Throughout his career he has specialized in control retrofits and retro commissioning, which has included seamlessly integrating dissimilar products on a unified platform.

#### 10:25 - 11:20: DDC Basics

This presentation will cover the basics of controls and DDC. This will include terminology, system types, and the evolution to DDC systems. Controllers and interface hardware as well as their types of inputs and outputs will be covered. We will also be learning about the software side of DDC which include software, programming and protocols.

**Speaker**: Mike Harrington, Senior Application Engineer @ <u>CFM Company</u>: Mike has been in the HVAC industry for nearly 18 years. He served as the Rocky Mountain Chapter President 2015-2016. He has extensive industry experience in commercial and industrial control systems as an integration contractor, commissioning agent, specifying engineer, and equipment representative. He is proficient with sequence of operations, the integration of equipment and multiple protocols. During his time in chapter leadership, the chapter was the first to surpass \$100,000 in research promotion and won the flip cup championship at one of the ASHRAE Region IX CRCs.

### 1:15 – 2:10: Dual Sourcing Controls

Even with the advent of more open systems many owners feel locked in once they have a building automation vendor. This session will discuss how to develop a set of standards and processes to create a truly competitive dual source environment.

**Speaker**: Ken Nekvasil, Sales Manager @ ATS Rocky <u>Mountain</u>: Ken has been in the HVAC industry for over 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.

# 2:30 – 3:25: Understanding What BACnet Is and Isn't

This session will cover the fundamentals of BACnet which will include why it was created, how it is fundamentally structured (Objects, PIC's, BIBB's, communication methods), what about BACnet (Alarming, trending, scheduling, self-discovery) made it the de facto open protocol standard and a little bit about what is doesn't do.

**Speaker**: Ken Nekvasil, Sales Manager @ ATS Rocky <u>Mountain</u>

# Track 5 – Critical Environments

Sponsored by: Air Purification



# 8:00 – 8:55: Using Active Chilled Beams to Reduce or Eliminate Reheat

Laboratories typically consume 5 - 10 times more energy per square foot than typical office buildings and a significant proportion of this energy is often wasted in reheating preconditioned air which occurs when there is a mismatch of the ventilation requirements and cooling loads. Active chilled beams have proven to be an effective solution to reducing reheat since the first beams were installed in North American laboratories around 2005. Active chilled beams require careful selection and positioning to ensure the manufacturers tested performance data is obtained and the supply air from the chilled beams does not interfere with the safe operation of the fume hoods. This presentation covers best practice design approaches, selection and layout of active chilled beams and how to optimize the chilled beam system design with variable volume primary air systems.

**Speaker:** Nick Searle, Chief Engineer and Sales @ Titus HVAC: Nick has over 20 years in HVAC application experience in a range of fields including noise control engineering, air distribution and most recently, air/water systems. Originally from the U.K. Nick has worked in the USA since 2006 supporting engineers, owners and architects with the design of chilled beam systems and has been involved with many of the first chilled beam systems to be installed in North America while working for TROX USA, Dadanco and Titus.

# 9:00 – 9:55: Textile Air Dispersion in Cultivation Facilities

The presentation will cover proper Textile Air dispersion design, specification, and installation considerations that will prevent issues and solve common air distribution challenges. The presenter will also provide an overview of air dispersion techniques applied on past Cultivation projects. **Speaker**: Andrew Sorenson, President & CEO, Prihoda North <u>America</u>: Andrew Sorenson has more the 14 years in Textile Air dispersion design and implementation in various applications in the HVAC industry. Past positions held were Technical sales engineer and Regional Sales Manager. Andrew is now the President and CEO of Prihoda North America.

## 10:25 – 11:20: Applying Needlepoint Cold Plasma in Commercial Applications

A brief review of ASHRAE 62.1 and applying cold plasma technology to reduce ventilation requirements by up to 75% in commercial applications through reducing particles and odors, and killing pathogens. The benefits are in reduced construction/renovation costs, energy savings, and reduced maintenance.

Speaker: Charles Waddell, President and CEO @ Global Plasma Solutions: Charles "Charlie" Waddell is the founding member of Global Plasma Solutions, a Savannah, Georgia, based air purification engineering and manufacturing company that specializes in government, education, and healthcare air guality and energy saving solutions. Charlie holds a BSEE and BSEM from Old Dominion University, Norfolk, VA. Charlie's prior experience to starting Global Plasma Solutions includes being the General Manager of North America for Desiccant Rotors International, the Executive Vice President of MeadWestVaco Air Systems, a division of MeadWestVaco, a Sales Manager for Des Champs/Munters and a Field Engineer for Siemens Medical. Charlie is an active member of ASHRAE and currently a participant of ASHRAE TC 2.3, and formerly the secretary of TC 8.12. Charlie is also a member of the newly formed USGBC Indoor Air Quality Assessment Committee, which intends to set the guidelines for "acceptable air guality" within LEED certified buildings.

# 1:15 – 2:10: Life Safety Impacts on Laboratory and Healthcare Design

This presentation will discuss the concepts of Life Safety Codes (NFPA, IBC, IFC) unique to hazardous and restricted mobility occupancies: smoke/fire compartmentalization and control areas; maximum allowable quantities of hazardous materials; fire resistive construction; HVAC penetrations; and Hazardous Exhaust Systems.

**Speaker**: Mark Jelinske, Chief Engineer @ The RMH Group: Mark has over 30 years of engineering experience, primarily as a consulting engineer, as well as a project engineer for a large mechanical contractor. He has been providing training and mentoring in house and at technical conferences for at least 15 years. He is a registered Professional Engineer in Mechanical Engineering and Fire Protection Engineering. He is active in the development process for several model codes, NFPA standards, and the FGI Guidelines. He has been designated as the ASHE Code Advocacy Liaison for Colorado, and serves on the Denver Building and Fire Code Task Force for the 2016 Denver Code Amendments. He has a Bachelor of Science degree from the University of Missouri- Rolla (Missouri University of Science and Technology).

# 2:30 – 3:25: Microgrids – What They Mean for the Mechanical Engineer

Exploring distributed energy resources in use today and those likely used in the future, this presentation covers the changing economics of utility power and microgrids affecting mechanical and electrical engineers. As combined heat and power systems decrease in cost and size, the economic and technical feasibility of mechanical systems interfacing with load sheading schemes needs evaluated. This is the focus of the discussion along with successful examples of microgrid integration.

Speaker: Jeff Elsner, P.E., LEED AP, Mechanical Engineer and Project Manager @ The RMH Group: Jeff is a mechanical engineer and project manager with extensive experience with healthcare facilities, central utility plants, and higher education campuses as well as laboratories, data centers, k-12 schools and office buildings. Jeff has special expertise with combined heat and power (CHP or cogeneration) systems through design and construction of two megawatt scale projects, and through feasibility and risk analysis efforts. He is a member of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) and the International District Energy Association (IDEA). Jeff presented on the topic of ventilation and energy in healthcare buildings at the 2014 Rocky Mountain ASHRAE Technical Conference in Denver, Colorado. He earned a B.S. degree in mechanical engineering from Colorado State University.

