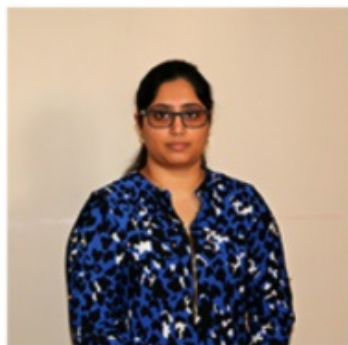




## ASHRAE Awards

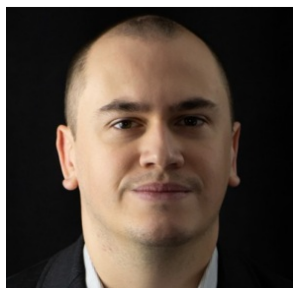
**Congratulations to the  
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from the Toronto Chapter!**



**2019-20 Development Leader Award**  
Alekhya Kaianathbhatta, Region II RVC, Smith + Andersen  
Badri Patel, Johnson Controls



**Dan Mills Chapter Programs Award**  
Beatriz Salazar, Smith and Andersen



**Engineering Technology Scholarship**

## Inside The Gazette

### *Sponsors*

*System Design and Selection*  
101

*Heating, Cooling and DHW  
using Combination Systems*

*How to Climb the Corporate  
Ladder*

### *Student Activities*

*Data-Driven Automation and  
Emission Reduction in Multi-  
Family Buildings*

### *Upcoming Online Webinar*

*ASHRAE Learning Institute  
Courses*

## Quick Links

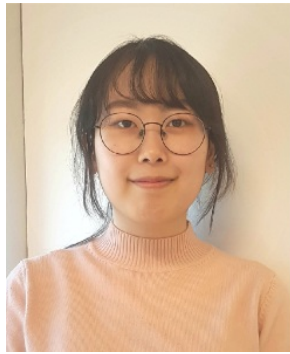
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[Meeting Registration](#)  
[Past Gazette Issues](#)  
[ASHRAE Society Website](#)

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**ASHRAE Technical Paper Award**  
Dr. Michael Roth, Phd., Klimaat Consulting & Innovation Inc  
*"The Use of Reanalysis in ASHRAE Applications (RP-1745)"*

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**SUMMARY WEBINAR ON 22nd FEBRUARY 2021**

**System Design and Selection 101**

Niss Feiner, Delta-T Designs Inc.

For February's Webinar, Mr. Niss Feiner of Delta-T Designs Inc. gave a presentation titled 'The Art of System Selection.' While the basic principle of sizing equipment for heating and cooling loads is simple, the selection of

an appropriate system is a complex, creative task.

Niss Feiner brought his experiences as a contractor to bear on the topic, explaining that poor system selection can damage the relationship between consultant and client, and warning against pre-selecting a solution before defining the problem. Designs are bespoke creations addressed to the needs of the project and client, and customization should not be sacrificed in the name of cost and expediency.

Mr. Feiner defined four stages of system design: in the first stage, problem definition, constraints – including those imposed by end users and by the building itself – are identified; in the second, unknowns are quantified; in the third, possible solutions are compiled, with each option being treated as equally viable. In the final stage, designers list the negative aspects of each design with the goal of removing faulty designs. The design with the least and most easily mitigated weaknesses is selected as the final design. During this stage it is important to be respectful, professional, and dispassionate in order to arrive at the best final selection.

The talk concluded with a real-world example involving the renovation of a church. Ultimately, the client did not accept the design proposed by Mr. Feiner's team, proving that a design team following a methodology to the best of their ability is not enough to guarantee a successful outcome. Since it is impossible to predict exactly how a project will go, designers should focus on solving the problem in a rigorous, intellectually honest fashion.

Summary by Monica Brands

Gazette Committee, ASHRAE Toronto Chapter

## SUMMARY WEBINAR ON 1st MARCH 2021

### Heating, Cooling and DHW Using Combination Systems

Steve Bagshaw, iFLOW HVAC Inc.

On March 1<sup>st</sup> 2021, Steve Bagshaw, from iFLOW HVAC Inc., gave a presentation to the ASHRAE Toronto Chapter on 'Heating, Cooling, and DHW using Combination Systems'. A combination system can be many things: for example, it can be a condensing tankless water heater paired with a hydronic furnace, a modulating/condensing combi-boiler paired with hydronic furnace, a mixed energy source system (gas & electric), a mixed appliance system, a mixed function system, a mixed alternative energy system, etc. The standards that govern the combi-systems are ASHRAE Standard 124 and CSA P.9-11 but at this point, they only cover gas-based combination systems. Steve then focused on energy consumption trends in residential houses.

Steve Bagshaw said that traditional furnaces are typically capable of producing 80,000 Btu/h while the average energy required by a 1,600 sq. ft. house during coldest months in GTA can be below 20,000 Btu/h. This means that the equipment will have to cycle multiple times because it is producing more heat than necessary. When cycling, that extra heat is lost as waste. AFUE (Annual Fuel Utilization Efficiency) of equipment only provides efficiency when the unit is running but is not sufficient to measure the cycling losses, which can significantly reduce the energy efficiency of equipment. Combi-Systems are capable of delivering heat efficiently at both peak and on milder winter days and are found to be more energy efficient than some of the Energy-Star rated equipment. This is due to the Combi-Systems cycling less and hence producing better efficiency.

Mr. Bagshaw stressed the importance of TDR (Turn Down Ratio) and said we are wasting a lot of energy as heat which is never utilized especially during fall and spring seasons. He said combination systems can be on average 9% more efficient than even Energy-star rated equipment, and the installed cost is comparable. Steve ended the presentation by showing the study done by Enbridge which confirms that using advanced AHU and 0.97 EF Tankless reduces gas consumption.

Summary by Eshan Patil

Gazette Committee, ASHRAE Toronto Chapter

## SUMMARY WEBINAR ON 8th MARCH 2021



## How to Climb the Corporate Ladder

Sheila J Hayter, PE, FASHRAE, LEED AP  
National Renewable Energy Laboratory  
(NREL)

Bertha Lai, P Eng., LEED AP BD+C  
Smith and Andersen

Joan M Hughes, CEM, CMVP  
NASA Headquarters

Sharon Godlewski  
Canadian Sales Manager

On March 8th, 2021, on the occasion of International Women's Day, four successful women in the field of mechanical engineering, Sheila J Hayter, Joan M Hughes, Bertha Lai, and Sharon Godlewski shared their stories and discussed various topics given to them. The interviewer was Azadeh Ghadimi, chair of the diversity committee of ASHRAE Toronto. They told how they reached where they are today, challenges they had to face, gender biases they experienced, etc. Before the panel discussion began, the story of Margaret Ingels, the first woman to graduate in engineering, was shared with the audience.

The background stories of four panelists were diverse. **Sheila Hayter** was influenced by her father from childhood who encouraged her to join Mechanical Engineering. She came to know about ASHRAE during her college years and volunteered with the student branch of ASHRAE. She later had the opportunity to work in a consulting firm where her working career in the HVAC industry began. **Joan Hughes** graduated with a degree in Petroleum Engineering after having been awarded an admission scholarship. She worked for an oil firm in New Mexico where she discovered that her passion laid elsewhere. She took on various roles such as physics teacher, journalist, agribusiness economic developer, and others, before realizing that her interest lies in sustainability. After working in a few more roles in engineering, she was hired for a contracting position in energy management for NASA where she is currently working in a civil service position as the Agency Energy Manager. **Sharon Godlewski** was interested in physics and math since childhood and gained mechanical and electrical engineering experience from her father who himself was an electrician. She studied business management before starting her career in sales and fell in love with HVAC during her professional career. **Bertha Lai** aspired to be an architect, but it was not a good job market, and she ended up in the engineering field designing supermarkets, hospitals, labs, among other projects. She worked for two companies before joining Smith and Andersen where she is currently working.

After explaining their background stories, the panelists told what inspired them to be the leader who they are today. Joan M Hughes mentioned that bringing the experience of working in various industries into an organization where everyone works from start to the end of their careers was helpful for her. She also came across many female leaders in engineering during the span of her career who were role models for her. Panelists then opened up on gender biases they experienced in their career. Sheila mentioned how a comment from her department head during her undergraduate degree. She received a comment "girls can't do math" which made her question her ability at that time. Sheila proved that comment wrong by graduating from college with A in most of her classes!

All four panelists then discussed work-life balance and how the line between work and life is blurred because everyone is now working from home due to COVID. Bertha suggested that discussing expectations and setting up boundaries between work and life is important. Furthermore, the challenges of raising children while pursuing a career were also discussed. Sharon said that a gap in the resume will be understood by the prospective employer if the candidate took the time off for the family and a candidate should be upfront and honest about it. The panel discussion was closed with the panelists giving advice to the young engineers who are entering the industry.

## STUDENT ACTIVITIES

### Summary of ASHRAE + RU Career Workshop: "Following up with Potential Employers"

On **March 10th**, the **Toronto Chapter Student Activities Committee** held a career development workshop titled '**ASHRAE + RU Career Workshop: Following up with Potential Employers**'. This is a key topic that is not touched on enough. There's numerous resources for making a pitch and preparing a resume, but not many job seekers know what to do after that.

This workshop gave valuable advice to job seekers on topics such as how not to waste employers' time, and how to leave a good impression. Job seekers were given examples of different approaches that they can make to potential employers, and the impressions they make. They were reminded that to build their network and career, they must put an effort into understanding the people who's advice, help or potential employment they seek, especially in a digital world where the human element is often lost. In the near future, the online webinar will be made available by logging on to the ASHRAE Toronto website.

### ASHRAE Society Scholarship Award Winners

We'd like to congratulate two students, Matthew Bigg and Yuno Oh on being awarded highly competitive ASHRAE society scholarships for the year of 2021! **Matthew Bigg** is currently participating in the Building Science Engineering Technology program at Seneca College. Matthew is the recipient of the **ASHRAE Society Engineering Technology Award**, valued at \$5,000 USD. **Yuno Oh** is currently a mechanical engineering co-op at Smith + Andersen Toronto. Yuna is the recipient of the **Lynn G. Bellenger Engineering Award**, valued at \$5,000 USD. Both have been very engaged with the ASHRAE community, and we hope to see their careers flourish with the support of ASHRAE Society!

Kajen E.

**Student Activities Chair, 2020-2021**

**ASHRAE Toronto Chapter**

<https://www.torontoashrae.com/students>

## SUMMARY WEBINAR ON 15th MARCH 2021

### Data-Driven Automation and Emission Reduction in Multi-Family Buildings

Mike Mulqueen, Parity Inc.; Jana Jedlovská, Parity Inc.

Abhishek Khurana is the CEO of Voyager Buildings, an Energy Services firm that installs HVAC Control systems and leverages AI to reduce operational cost and carbon emissions in buildings. Mr. Khurana is also the incoming President of ASHRAE Toronto Chapter. He talked about how the following HVAC Equipment in multi-family building is controlled by the BAS: Cooling towers, chillers, boilers, make-up air units, and other miscellaneous systems such as meters, sump pumps etc. Equipment which typically has stand-alone controls are in-suite fan coils, unit heaters and sometimes amenity HVAC equipment as well. Presently 30% to 40% of the energy supplied to multi-family buildings goes to waste, something Mr. Khurana is working to change.

Mike Mulqueen is Senior VP Sales and Business Development at Parity Inc. which does real time commissioning of buildings using data to optimize operation and reduce energy waste. Prior to that, he was with the city of Toronto planning department for seven years, where one of the first projects he worked on, as part of a small team, was the Toronto Green Development Standard. Mr. Mulqueen then worked for Toronto Hydro and witnessed the large efficiency gap between buildings “as designed” versus buildings “as operated”.

Mr. Mulqueen explained how once a building is constructed, using continuous data from sensors can improve performance. If maintenance is driven by data, it can be preventative, not reactive maintenance. Data allows right-sizing equipment for upgrades, and the true measurement of savings and trends. New equipment controls with machine learning can respond to the building’s particular thermal characteristics, learned occupancy, predictive weather and feedback from suites. Exponential growth in processing power and cloud computing enables connecting more devices than before. Increasingly, we are also able to connect different types of equipment using a variety of protocols to establish real-time two-way communication with optimization across multiple mechanical processes. One application of all this data, including suite level feedback and deep learning algorithms is optimizing the setpoints of boilers and chillers. Figures 1 and 2 below show how a better way to optimize the boiler set point. A split scale, responding to Delta T (supply versus return temps) and suite temperature feedback instead of Standard Reset is used. The high runtime-modulation of the boiler was reduced and a drop in gas consumption was achieved as shown, in the Ret Screen CuSum curve.

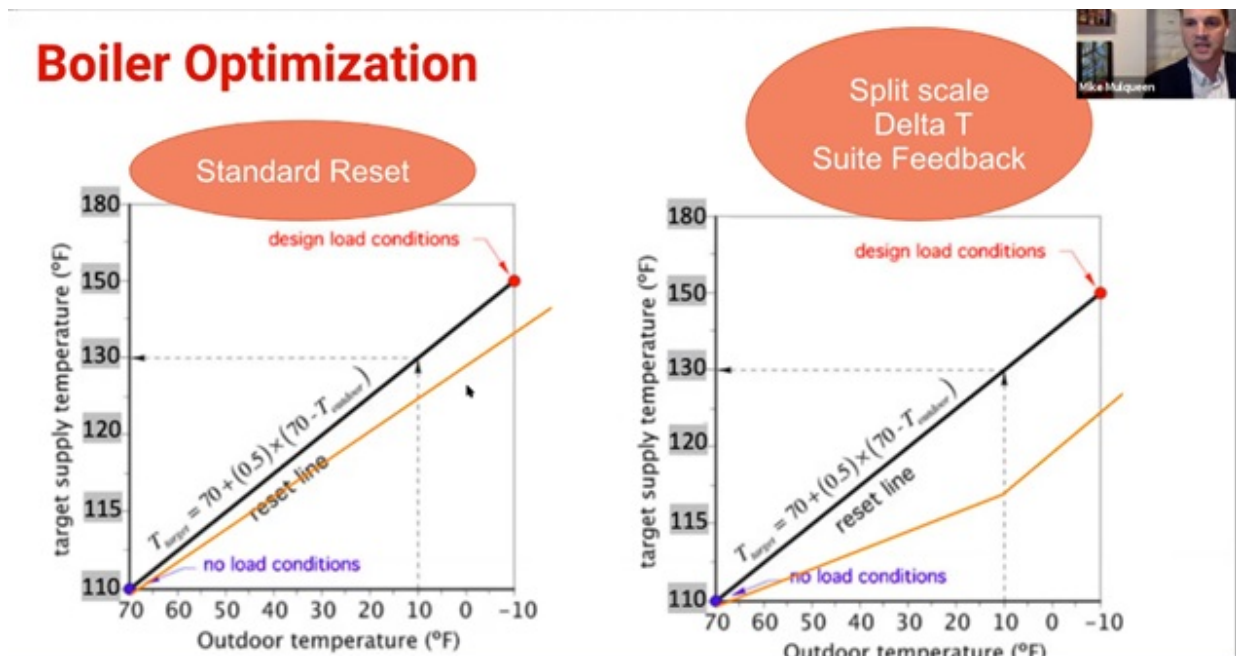


Figure 1. Boiler Optimization: Standard Reset versus Split Scale Delta T Suite Feedback.

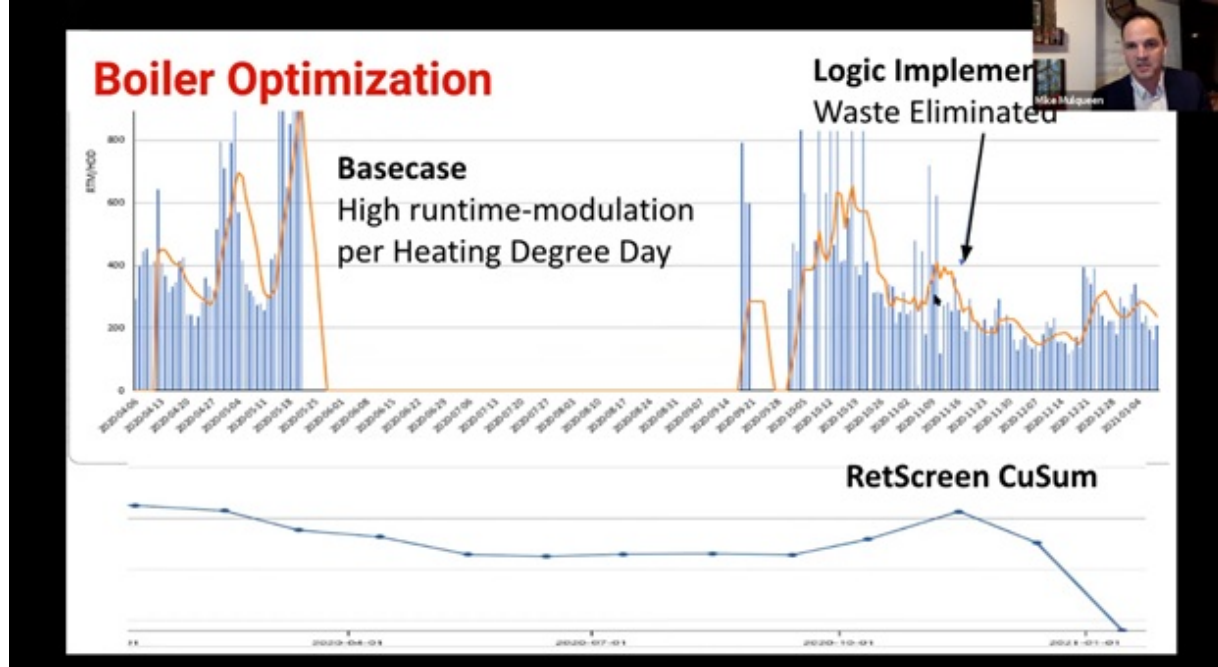


Figure 2. High runtime-modulation of the boiler is reduced using logic.

Jana Jedlovská is Director of Product at Parity Inc. Jana began her career in consulting working primarily on sustainable, carbon neutral, and net zero new buildings. After that Jana joined Toronto Hydro, and was recently leading a team with the goal to increase energy efficiency in multi-unit residential buildings. Jana discussed measurement and verification savings analysis, and predictive, self-healing buildings.

After installation of energy conservation technology, Measurement and Verification Savings Analysis has been traditionally done with power meters. The limitation of this method is that it is a short snapshot in time. As soon as the reporting period is over, savings can change. For example, the operator can change the control sequence, the chiller might not be optimized for the new cooling period, or a piece of equipment can fail and not get reset to the proper baseline. Large amounts of real time data from all the equipment and continuous analytics can reduce energy usage and detect faults early. To give an example, a drop in circuit pressure and falling boiler return water temperature indicated a pump went down. The pump was able to be reset without anyone going in and before the residents started complaining.

Jana Jedlovská said we are presently in the human guided phase of the utilization of machine learning; some trial and error and iteration is required for relevant inputs and algorithms. In the future, real-time data, machine learning, deep learning and AI will lead to improved control and automation of HVAC and enable self-healing buildings with increasingly less need for human intervention. The result will be more energy conservation, better thermal comfort of occupants, and more building resilience. According to Jana "innovation is going to continue to accelerate which makes it a very exciting time for HVAC optimization in multi-family buildings".

Summary by Anne-Marie Bundgard

Gazette Committee, ASHRAE Toronto Chapter

## UPCOMING WEBINAR

### Upcoming Online Webinar

## Refrigeration 101

Speaker: **Michael Genin**, P. Eng. Advance Industrial Refrigeration (AIR)  
ASHRAE Toronto Refrigeration Chair



Date: Monday - May 3rd, 2021  
Start Time: 5:30 pm

[REGISTER HERE](#)

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***HVAC Design Training: Tools for High Performance Building Design***

26 Apr 2021, Virtual | Level I, 8:30am – 12:20pm EDT

***Humidity Control I: Design Tips and Traps***

27 Apr 2021, 3:00 PM to 6:00 PM EST

***New! An Introduction to ASHRAE Existing Building Commissioning Process***, 04 May 2021,  
10:00 AM to 11:00 AM EDT

***Updated! Fundamentals of Ultraviolet Germicidal Irradiation (UVGI) for Air and Surface Disinfection***

11 May 2021, 10:00 AM to 1:00 PM EDT

***New! Improving School's HVAC Systems for IAQ and Infectious Aerosol Management***

18 May 2021, 11:00 AM to 2:00 PM EDT

***And More...***

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