

# ASHRAE 2018 Summer Meeting – Houston

## TC 1.5 Computer Applications- Minutes

TC 1.5 Public Web site: <http://tc0105.ashraetcs.org/>

TC 1.5 ListServ (mailing list) : tc105\_all\_1st@listman.ashrae.org (Contact chair or vice chair to be added)

TC 1.5 Members-only Site: Basecamp (Contact chair ([sroth@carmelsoft.com](mailto:sroth@carmelsoft.com)) or vice chair to be added)

**Main Committee Meeting**

**Monday June 25**

**(25/25)**

**6:30-9:00 PM**

Seminar Sponsoring and Cosponsoring:

**Seminar 16:** Urban-Scale Energy Modeling, Part 8

**Seminar 43:** What is BACnet Tagging About?

**Seminar TC:** Early HVAC System Modeling and Efficiency Comparison Tool using the New Building Energy Efficiency Ratio (BEER)

Call to order at 6:36

1. **Welcome:** Introductions
2. **Roll Call:** Number of voting members present to reach quorum (5): Stephen Roth (Chair), Todd Gottshall (term ending 6/30/18), Joshua New, Mike Galler, ~~Dave Branson (term ending 6/30/18), John Crosby, Bruce Billedeaux,~~ Carol Lomonaco  
**5 of 8 present, quorum reached**
3. New voting members starting 7/1/2018 will be: Tim Dwyer, Cameron Labunski, Steven Rosen, Ed Tsui
4. **Review of Agenda**
5. **Motion: Approval Of Minutes from 2018 Winter Conference in Chicago**  
Joshua New moves, Todd Gotshall seconds.  
**Passes: 5/0/0 (3 absent)**
6. **Review Action Items from 2018 Summer Conference in Chicago (open action items in table below)**

Responsible Member	Description	Due Date	Completion Date
Stephen Roth	Reserve Houston room locations	3.8.18	3.8.18
Mike Galler	2 website action items: <ol style="list-style-type: none"><li>1. Post section announcements on web site from subcommittee reports</li><li>2. Find previous minutes to update new website</li></ol>	Continuing	1 month after mtg.

### 7. Subcommittee Reports:

- a. Emerging Applications: Anthony Fontanini

Urban-scale modeling discussion, 16 people in the meeting

Discussion on potential Kaggle competition potentially hosted by TC4.7; Kaggle is a website of data scientists from multiple fields, can post Jupiter notebooks, free, contribute for name of science. Competitions page, some are paid. Interest in ASHRAE sponsoring a Kaggle competition for the old energy predictor shootout version 1 and 2 for predicting energy performance from buildings. TC4.7 is trying to get an organization committee to get this rolling. Is there anyone interested in this committee that would be interested in this? Krishnan Gowri and Todd Gotshall are interested.

**Motion: TC1.5 co-sponsor a Kaggle competition and sponsor if TC4.7 doesn't sponsor.**

Stephen Roth moves, Krishnan seconds.

Comments: Carol Lomanaco - any status on IP or ownership? Tony: other corporate sponsors with this, been in contact with TAC regarding IP ownership. Todd: RAC has funding to do things with other research projects, maybe there's another.

**Passes: 5/0/0**

b. Program: Mike Galler

3 program items for this meeting:

- **Seminar 16:** Urban-Scale Energy Modeling, Part 8 (Joshua New)
- **Seminar 43:** What is BACnet Tagging About? (Carol Lomanaco)
- **Seminar TC:** Early HVAC System Modeling and Efficiency Comparison Tool using the New Building Energy Efficiency Ratio (BEER)

Winter conference deadline papers are July 9 and seminar submissions August 3.

Ideas for Atlanta:

Blockchain (Tim Dwyer)

Cybersecurity (Mike Galler)

Psychology (Dave Branson)

Equipment Selection tool

System Errors and Misapplications (Carol Lomanaco) – TC1.5 sponsor, and

TC7.5, TG2 co-sponsors, IT security consultants speaking

c. CyberSecurity: Mike Galler

CIBSE has decided not to cofund effort

Event-driven cybersecurity is of more interest than operational cybersecurity

David Branson is considering submission to MTG, have 8 liaisons of the required 7

d. Research: Todd Gottshall

1 TRP out for bid to vote on later, need to assemble our PMS, tentative list

Rob Hitchcock's "BIM-Data-Content-Development (TRP-1801)

3 other work statements in progress:

- WS-1810 gbXML Reference BIM Test Cases (Stephen Roth)
- WS-1811 Occupancy from Social Media Data Mining (Bing Dong)
- WS-1849 Facial Temp Driven Control (Joon-Ho Choi)

- WS-1815 Occupant Behavior Data (Rob Hitchcock) – RTAR approved by RAC but Rob tardy in developing work statement
  - Basic Idea: LBNL created obXML to represent individual occupants and actions in a building. Focus of project is to integrate detailed information with more static information in gbXML which identifies spaces but not movement of individual occupant movements and actions. Not creating data or simulation but combining schema.
  - Stephen: what's a real-world use case? Rob: can take data from obXML and account for it in a building energy simulation environment. Much work in IEA Annex on occupant behavior. Looking to more easily import those data into building performance simulation tools. Longer term, it will be a necessity as you get to lower energy buildings where occupant behavior makes more important data.
  - Stephen: How are they capturing it? Rob: artificially generating primarily.
  - **Motion: TC1.5 co-sponsor WS-1815.**  
Stephen Roth moves, Todd seconds.  
Discussion - Todd: Any feedback from RAC on RTAR? Todd: Yes, need to know how it'd be relevant to society. Rob: It would be ideal to read in July and vote to co-sponsor again once post-draft.  
**Motion passes: 5/0/0**
  - Todd already posted to basecamp. Stephen Roth, Michael Galler, and Todd Gotshall volunteered to give feedback.
- New RTAR ideas
  - Drones for survey of HVAC information
  - Augmented Reality for Construction
- Krishnan recommends discussing Drone survey from TC7.5

Dinner decision to eat at Grotto with ~8 people interested

- e. Handbook: Krishnan Gowri  
Have draft posted to basecamp, way behind in terms of meeting the deadline, hoped to have full draft for voting at this meeting but not ready to do so, plan to prepare final draft for electronic ballot by July 15. Krishnan requests comments on current draft directly to him by July 10. Official deadline for final submission in 7/31.  
Rob Hitchcock: we've had a request for graphics to liven up the chapter.
  - f. Standards: Steven Rosen  
None.
  - g. Web Page: Mike Galler  
None.
8. **YEA update:** Lindsey King requests reconsidering the times that the TC meets so that YEA members could attend without interfering with planned socials.
9. **Chair's Report:**

- a. Review goals for Stephen Roth's 2-year term (are these reasonable, yet a bit aggressive?):
  - i. At least 4 sponsored or co-sponsored seminars/workshops per meeting
    - Mike Galler: we have 3 at this one and 2 at Chicago
    - Stephen Roth: recommend sending email out right after the meeting and need people to submit proposals; also recommend contacting track chair to socialize the idea
    - Jason DeGraw: was on CEC, was track chair, and 1 committee contacted him and they got their program item
    - Carol Lomanaco: under program committee folder on basecamp, Carol's put her draft proposal
  - ii. At least 1 new RTAR and WS per meeting
    - Stephen: we're exceeding that
  - iii. At least 3 new TC 1.5 members per meeting. In fact, since the last meeting we have 13 new members:
    - Marcos Perez Blanco
    - Mangaya Sivagnanam
    - Dr. Jonathan Ingram
    - Andrei-Claudiu Cosma
    - Premkumar Siddharth
    - Jennifer Lather
    - Todd Kwao-vovo
    - Mark Adams
    - Taiwo Ajayi
    - Vrunda Patel
    - Sahil Priyadarshi
    - Anthony Fontanini
    - David Griffin

**Action Item:** Chair must update people from provisional corresponding member to corresponding member after 1 year or they roll off.
  - iv. Sponsor or co-sponsor at least 1 new standard during the 2-year term
  - v. Rename our TC
    - Will address later in the meeting
- b. Ask members to update ASHRAE profile when info changes. There is a new online portal at:
  - [https://web.ashrae.org/tech\\_committees2/index\\_v77.php?com\\_id=nave4rabakuw](https://web.ashrae.org/tech_committees2/index_v77.php?com_id=nave4rabakuw)
  - Lindsey King gives updates:
    - Required dates for uploading information changed 6 months ago. Stricter about getting minutes within 60 days of meeting, and put on website.
    - Reach out to Tiffany Cox if interested in reviewing papers.
    - TC members are using ASHRAE letterhead, can use internally but do not share/distribute. Someone was commenting on an AMSE standard on ASHRAE letterhead, AMSE asked if this was an ASHRAE official position. TC represented view as ASHRAE position. Dozen others said has been going on so had to tighten screws at the top level. Official policy is that board of directors and president must sign to allow use of ASHRAE letterhead.
- c. Present new Roster for 2018-2019
- d. PEC report: Recommendations from TC 1.5

- e. Discuss possibly holding subcommittee meetings prior to actual ASHRAE Meeting
- f. You all will be receiving an email about employee thank you letters in early August with details on how to request a thank you letter.
- g. 2019 Remote Participation Meetings Request
- h. Present dinner plans

## 10. Liaison Reports

- a. BIM-MTG (Krishnan Gowri)
  - i. Standard 224 is initiative to define BIM requirements for owners. It's a standard for minimum requirements of BIM data in construction documents.
  - ii. RP1801 that we're looking forward to supporting
- b. TAC
  - i. Nothing new beyond what Lindsey King reported earlier. MTG Effective Building Operations (EBO) has been formed.

## 11. Seminar TC: Les Nelson and/or Rick Bostian will present a brief seminar on "Early HVAC System Modeling and Efficiency Comparison Tool using the New Building Energy Efficiency Ratio (BEER)" – 15 minutes

Free software, putting something together for asset managers and design teams that don't understand what TC1.5 talks about. 5 years ago, 50 manufacturers and 12 contractors, decision maker doesn't have a tool to move energy efficiency forward. Started by putting in city for weather data, basic cube of building, and then dropdown boxes to pick HVAC systems and couldn't do it bc too hard. Developed wizard for 9 families and default everything from loads to costs (installation, maintenance, system life). Not replace EnergyPlus, not in cloud (on computer), but new system for moving forward. Gives instant results, tries to give initial preview, hope to hire people to run EnergyPlus and do analysis but need to bridge the gap. Pro-hydraulics but has been open and transparent as can be, has 9 pages (1 page input data – load/ft<sup>2</sup> or loads if you know it). Over 100 different defaults you can change. Know where building will be, size of the building (cube). Targeting less than 200,000 ft<sup>2</sup> to help them use energy efficiency when they normally don't. Output is in \$/ft<sup>2</sup> index for each design decision.

Asks for organizations willing to peer review of BEER.

Question as to whether TC1.5 can verify BEER is compliant. Know that the TC can't endorse it, but want feedback. Joshua New gives feedback and information regarding SSPC140 since BEER has not been accessed by that standard.

## 12. Old Business

## 13. New Business

- a. ASHRAE Journal is making plans for the 125th anniversary with articles in the issues from July 2019 through June 2020. ASHRAE would like to publish some articles related to future trends in the HVAC&R industry. The publisher thought TC 1.5 would be a good place to start in the hunt for an author(s). Jay Scott will be talking about this tonight.

**Action Item:** Joshua New, Mike Galler, and Carol Lomanaco to assist Jay Scott's creation of a future trends in the HVAC&R industry.

- b. Discuss update to TC 1.5 Title-Purpose-Scope (TPS) to reflect new realities in technology. I published a Doodle poll in March with six potential titles. These are the results:
  - i. Emerging Technology Applications (10)
  - ii. Emerging Digital Technologies (6)
  - iii. Emerging Digital Technology Applications (4)
  - iv. Digital Information Technologies (3)
  - v. Advanced Digital Technology Applications (1)
  - vi. Emerging Applications (0)

Joshua New moves that we vote on changing the title of the TC. Carol seconds.  
Discussion: Digital – how relevant to quantum computing  
Joshua New changes the motion.

**Motion: Change the title of our TC to “Emerging Technology**

**Applications”.**

Joshua New moves, Carol Lomanaco seconds.

Discussion: Are we going to define technology? Why technology, perhaps it should be information? TC8.11 has longer title. BTO main subprograms is emerging technologies which covers everything. Could run aflow of other technologies.

**Vote: 5/0/0** (3 absent, chair voting)

**Action Item:** Chair will revise purpose and scope over next 6 months.

Stephen to write Title and justification by 8/31, based on feedback to start revisions to purpose and scope.

TAC forms website has information on revising TPS.

Amir Jokar willing to move through proper channels once voted on.

Krishnan has 3 recommendations: code of ethics, review TPS, and discuss membership plans.

- c. **Vote on the proposed bidder for TRP-1801** based on PES recommendations  
Michael Galler mention GPC36 (standard sequences of operation) may be of interest to participants.

**A vote was conducted and the PES recommendation was accepted.**

14. **Next Meeting Times:** ASHRAE Winter Conference, January 16, 2019 – Atlanta, GA

15. **Adjournment**

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# Draft - Meeting Agenda

ASHRAE 2018 Annual Meeting – Houston, TX

## TC 1.5 Computer Applications Emerging Application Subcommittee

**Sunday, June 24, 5:00 pm - 6:00 pm**

**372CF (3), GRBCC**

Chair: Anthony D. Fontanini, [anthony.fontanini@nrel.gov](mailto:anthony.fontanini@nrel.gov), 720-527-9786

- Call to Order – 5:00 PM

Attendance:

Name	Present?	Voting Status	Committee Position
Stephen Roth	X	Yes	CHAIR/SECRETARY/STANDARDS SUBC CH
Lindsey King		Yes	VICE CH/PROGRAM SUBC CH
Joshua New	X	Yes	Secretary EMERGING APPLICATIONS SUBC CH
Todd Gottshall	X	Yes	Research Subcommittee Chair
John Crosby		Yes	
Michael Galler	X	Yes	Webmaster Cybersecurity Subcommittee Chair
David Branson	X	Yes	Member
Michael Pouchak		Yes	Member
Bruce Billedeaux		Yes	Member
Carol Lomonaco		Yes	Member

Non-voting attendance: **Anthony Fontanini, Mitchell Paulus, Rob Hitchcock, Farhad Omar, Amanda Pertzburn, Joshua New, Jeff Haberl, John Gibbemeyer, Mark Adams, Kyle Benne, Michael Wetter**

- **Approval of Minutes from Chicago 2018 winter meeting**
- **Chair's Report**
  - Welcome old and new attendees and encourage participation.
- **Review of Action Items and Activities from previous meeting**
  - Program Review for this meeting:  
**Seminar 16 - Urban-Scale Energy Modeling, Part 8**  
*Date and Time: Sunday, June 24<sup>th</sup>, 11:00 am – 12:30 pm*  
*Track: Fundamentals and Applications*

Room: 372AD, (3), GRBCC

*Sponsors: 1.5 - Computer Applications and 4.7 – Energy Calculations*

*Chair: Joshua New, Ph.D., Oak Ridge National Laboratory, Oak Ridge, TN*

**1. A Comparison of Two Modeling Approaches for Establishing and Implementing Energy Use Reduction Targets for a University Campus, Shreshth Nagpal, MIT,**

*Boston, MA*

**2. Impacts of Building Geometry Simplification on Energy Simulation Results of Urban Building Energy Models, Tianzhen Hong, Member, Lawrence Berkeley National Lab, Berkeley, CA**

*Lab, Berkeley, CA*

**3. Stepping Outside the Door: Using Building Energy Modeling to Understand the Impact of Energy Choices, Matt Cox, The Greelink Group, Atlanta, GA**

**Seminar TC - Early HVAC System Modeling and Efficiency Comparison Tool using the New Building Energy Efficiency Ratio (BEER)**

*Date and Time: Tuesday, June 26<sup>th</sup>, 8:00 am – 9:30 pm*

*Track: HVAC&R Analytics*

*Room: 370CF, (3), GRBCC*

*Sponsor: 1.5 – Computer Applications*

*Chair: Richard M. Bostian, HIA-C, Edmond, OK*

**Seminar 43 - What is BACnet Tagging About?**

*Date and Time: Tuesday, June 26<sup>th</sup>, 8:00 am – 9:30 pm*

*Track: HVAC&R Control Freaks*

*Room: 372BE, (3), GRBCC*

*Sponsors: 7.5 - Smart Building Systems, 1.4 - Control Theory and Application and SSPC 135, TC 1.5*

*Chair: Carol Lomonaco, Johnson Controls, Milwaukee, WI*

**1. Semantic Information on Building Data, Bernhard Isler, Siemens Switzerland, Zug, Switzerland**

**2. Why the Tagging Model is Essential to Having Interoperable Smart Devices That Can Communicate on an M2M Basis, Grant Wichenko, Member, Appin Associate, Wiinpieg, MB, Canada**

*Wiinpieg, MB, Canada*

**3. The Vision for Using Tags Moving Forward, Clifford Copass, Johnson Controls, Milwaukee, WI**

- **New Business (brainstorming)**

Creating a Kaggle Completion - Building Calibration/Prediction Robo-shoutout

Fontanini - Non-student based data-scientist competition for building energy calibration/prediction. Which committee is the best place for this competition TC 4.7 or TC 1.5? Letters of support of interest for 1.5, 4.7. Replicate what was done in the “Great Predictor Corrector Shootout.” Identify a set of people that will be a scientific committee (12-15). Dr. Clayton Miller – National University of Singapore is also in support of this project. ASHRAE Chapter Miller’s Students. Leverage international connection as part of the ASHRAE strategic plan. Sponsorship for prize money. Licensing. Required to write a transaction paper and present.

Haberl: 7.5 Smart Grid subcommittee interested. Ideas, booby traps into the dataset?, not just shootout 1 or 2 but on steroids. End goal is to say what is the best models. Public competition. Demonstrates the ability to test the models.

Interested people: Jeff Haberl, Mitchell Paulus, Anthony Fontanini.

TC 1.5 – May be 4.7 sponsor with 1.5 co-sponsor. Ask TC 1.5 to co-sponsor, if TC 4.7 sponsors, else TC 1.5 sponsor. Fontanini to bring up co-sponsorship at 1.5 main meeting.

Other mentions before research projects:

Haberl - RP-1468: BIM to Thermal. Demonstration to BIM to BE(M/S). Guidelines windows should be modeled a certain way. Future work. Getting 2<sup>nd</sup> paper out.

Research project –

- Urban-scale building energy modeling

Fontanini - ResStock has Multifamily upgrade, ComStock Rollout (NREL)

New – May submit Part 9. Kyle – UrbanOpt could be a presentation

- Social media technologies

WS – 1811: Determining occupancy patterns. About to be submitted to RAC in Aug.

Could track people by cell phones in buildings. Tracking access cards predict retention of freshmen. Mining social media tags. IP connections tracking within a university campus. Talked with Google (New) to track location, area constraint (restraints). Texas Transportation tracks automobiles deidentified.

RTAR idea: Jeff and Joshua will develop RTAR.

New – LandScan description. 14 data sources to scan every 90 m. Cyber security program how to avoid being tracked.

- Modelica language and functional mockup units (FMUs)

New - Spawn is well underway, highly rated. Replace E+ 5+ years down the road. Biggest road block is speed. FMUs allows to exchange information between simulation engines. Quantized state space advantages, doesn't run until building change.

Haberl – Quantized state interesting topic.

Wetter – Don't have time results yet. Need to finish implementation within the next year. For toy problem, seems promising, but not sure for full modes. Problems seem favorable. Not conclusive.

Fontanini - What is after E+ seminar topic Fontanini to work with Wetter to develop list. IBPSA 1 project, Annex 60. Another potential NREL to integrate with SPAWN.

- Drones

Fontanini - Acoustic Air Leakage Quantification (ANL)

Haberl – Projects drone to fly around to reconstruct Building Model Geometry. Where you can't see surface with shade.

New – Led program item to use drones to use in research. Was scrapped as an item. Restrictions to airports. Want to have drones read name plates on HVAC equipment.

- Mobile applications
- Web-services

Haberl – Web based code compliance software may be a huge untapped potential. Separate from REMRATE/RESNET.

- Big data modeling/mining

7.5 – Big discussion, TC 1.5 should check and coordinate efforts.

- Virtual and Augmented Reality

New - Market report is not faring well. Cell phones with augmented reality.

Gottshall - Trimble has augmented reality

Haberl – Be good to have a program item on Trimble's app.

New – if Trimble avenue is pursued. Josh has some contacts.

- Artificial intelligence

New – Convolutional neural networks outperform humans, GPUs. TensorFlow is the big library used. Program items in this area?

Revit learns how you draw and give suggestions.

- Open Discussion

Application areas that are of interest to this subcommittee as they apply to the HVAC industry include but not limited to:

- Advanced Design Tools
- Contracting and Business
- Education and Training
- Engineering Design Productivity
- HVAC System, Equipment, and Component Optimization
- Operating Procedures and Diagnostics

Examples of current computer technologies that are of interest to this subcommittee include:

- Augmented Reality, GPS & GIS Application

- Building Information Modeling (BIM)
- Blockchain
- Cloud-based Computing
- Data Exchange and Interoperability
- Game Theory
- HVAC Applications for Smart Phones and Tablet Computers
- HVAC System Modeling Using Data Mining and Knowledge Discovery
- Optimal Control Using HVAC System Model based on Data Mining Approach
- Multi-disciplinary Design Optimization
- Multimedia
- Virtual Reality / Virtual BIM

- **Meeting Action Items**

- **Next Meeting Time**

January 12-16 – Atlanta, GA, USA

- **Adjourn** – 6:00 pm
-