

**AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND  
 AIR CONDITIONING ENGINEERS, INC.**

1791Tullie Circle, NE / Atlanta, GA30329  
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**TC/TG/TRG MINUTES COVER SHEET**

(Minutes of all TC/TG/TRG Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/TRG NO.:	<b>4.10</b>		TC/TG/TRG TITLE:	<b>INDOOR ENVIRONMENTAL MODELING</b>			
DATE OF MEETING:	January 25, 2016		LOCATION:	Orlando, FL			
DATE ISSUED:	January 28, 2016		RECORDED BY:	Wangda Zuo			
VOTING MEMBERS	TERM		PRESENT	OFFICERS		TERM	
	On	Off				On	Off
Yang, Xudong	12	16	✓	Chair	Novoselac, Atila	15	17
Khalifa, Ezzat	12	16	X	Vice Chair	Koupriyanov, Mikhail	15	17
Zuo, Wangda	12	16	✓	Secretary	Zuo, Wangda	15	17
Novoselac, Atila	13	17	✓	Programs	VanGilder, Jim	14	N/A
Malcolm Cook	13	17	✓	Research	Lin, Charlie	15	N/A
Zhai, John	13	17	✓	Handbook	Lo, James	13	N/A
Lin, Chengxian (Charlie)	13	17	✓	Membership	Reza Ghias	15	N/A
Hosni, Mohammad (Mo)	13	17	✓	Web Page	Lo, James	13	N/A
Lo, James	14	18	X	Honors and Awards	Lin, Chao-Hsin	16	N/A
Lin, Chao-Hsin	15	19	✓	ALI	Zhai, John	04	N/A

**Attendance List: See Appendix B**

Technical Committee 4.10 – Indoor Environmental Modeling  
 These minutes are a **DRAFT** until voted upon by the committee.

<b>Society Liaisons, etc.</b>		<b>PRESENT</b>
LeViseur, Suzanne	TAC Section Head	
Meredith, David	Prof. Devt. Committee	
James Aswegan	Standards Liaison	✓
Hosni, Mo	Program Liaison	
Bahnfleth, William	TAC Chairman	
Ferguson, Kimball	Special Publications Liaison	
Ramspeck, Claire	Staff Liaison (Standards)	
Gulledge, Charles E.	TEGA Liaison	
Vaughn, Michael	Staff Liaison (Research)	
Aswegan, James	Handbook Liason	
Xudong Yang	Section 4 Research Liason	✓

**Call to order by Chairman:** (Atila Novoselac) at 2:15 p.m.

**Welcome** by Atila Novoselac

**Self-Introductions of attendees**

**Roll call** (Charlie Lin) – voting members

VanGilder, Jim	Yes	Zuo, Wangda	Yes
Yang, Xudong (internat.)	Yes	Novoselac, Atila	Yes
Khalifa, Ezzat	No	Cook, Malcolm (internat.)	Yes
Hosni, Mo	Yes	Zhai, John	Yes
Lo, James	No	Lin, Chao-Hsin	Yes

**Attendance**

- **6 of 8** non-international voting members were present
- **2 of 2** international voting members was present
- **Quorum achieved** without counting the Chair
- Non-voting officers present: Mike Koupriyanov

**Minutes from Atlanta meeting**

- Discussion and comments on list of voting members. There are some confusion in voting membership due to the mistakes. We will use the ASHRAE roster as the reference.
- Call Approval of Chicago minutes
  - **Vote: (7-0-1-0), Chair Not Vote**
  - **Atlanta minutes approved**

**ASHRAE Liaison checks the status of Guideline 33**

**Announcements** (Atila Novoselac)

- Management by objective for the TC. Discussion on actual of the TC 4.10.
- Awards nomination needed
- Seminar proposal for St Louis is Feb 8<sup>th</sup>.
- Fee is waived for invited speaker who is non-ASHRAE member

**Membership** (Atila Novoselac)

- Voting Members
  - Rolled off (July 2016): Xudong Yang, Wangda Zuo, Ezzat Khalifa, Jim VanGilder
  - Rolled on (July 2016): Reza Ghias, Charlie Lin, Mikhail Koupriyanov, Jamie Bennett, Tengfei Zhang (international)

**Research** (Charlie Lin)

The research subcommittee met on Sunday (01/24) at 5:00-6:00 pm. There were 21 attendees in the meeting. Note: Revolving submission deadlines: **May 15<sup>th</sup>, August 15<sup>th</sup>, and December 15<sup>th</sup>.**

**Current Projects**

Projects	PES	Title	Status
RP-1675	Jim VanGilder, Mark Seymour, Wangda Zuo	Guidance for CFD Modeling of Data Centers	

**Proposals in Progress**

Type	Designation	Author(s)	Title	Status
RTAR	N/A	Ray Horstman	CFD Particle Inhalation Modeling of Aircraft Cabins as Spares Non- Uniform Spaces	<ul style="list-style-type: none"> <li>The WS is revised according to the TC comments.</li> <li>TC Vote (7-0-0-1) to approve the RTAR</li> </ul>
RTAR-1744	N/A	Malcolm Cook (Panagiota Karava)	Guidelines for the Accurate Use of CFD for Modeling Naturally Ventilated Indoor Spaces	<ul style="list-style-type: none"> <li>WS is expected to be submitted to TC by April 15, 2016.</li> <li>A online meeting in October is planned</li> <li>Still looking for participants.</li> </ul>

Current RP reports

- None at this time.

Work Statements

New RTARs

Co-sponsored projects

There are three RTARs requested co-sponsorship from TC 4.10. No updates since last meeting.

External Requests

New Ideas

- Use coupled CFD-thermal comfort model to evaluate the thermal comfort for a whole building with natural ventilation. Then develop a guideline for that.
- Flexible ducts (Chao-Hsin Lin, Jamie Bennett, Wangda Zuo), TC 5.2 has experimental data, possible co-sponsorship from TC 5.2
- Right velocity for plug flow (Jamie Bennett), industrial painting process, will start the RTAR development after Orlando meeting
- Big data, how to use big data for buildings. A lot of discussion, not conclusion yet.
- Moisture transportation through the wall. A lot of discussion, not conclusion yet. Tengfei Zhang will look at it.
- Potential flow method and validation (Jim VanGilder)
- Boundary condition for simulation of particles (John will check with Leon for the last version of the RTAR)

**Handbook (Jim VanGilder)**

The Handbook Subcommittee met on Sunday (01/24) from 3:00-4:00pm

- The deadline is June 2017 for changes to the fundamentals chapter, no changes at this point

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- Need more examples in the chapter (various volunteers signed on the comments)
- TC 9.3 has a good chapter for reference
- Focus on principles of CFD modeling for different application

**Program (James VanGilder)**

The Program Subcommittee met on Sunday (01/24) from 4:00-5:00pm.

<b>ASHRAE Orlando, Winter 2016</b>			
<b>Session Type</b>	<b>Session Title</b>	<b>Session Chair</b>	<b>Contributing Authors</b>
Seminar	New CFD techniques for Design of Air Distribution Systems (Sunday 11:00am-12:30pm)	Atila Novoselac	Wangda Zuo Jim VanGilder John Zhai Charlie Lin

<b>ASHRAE St Louis, Summer 2016</b>			
<b>Session Type</b>	<b>Session Title</b>	<b>Session Chair</b>	<b>Contributing Authors</b>
Seminar	Ventilation Energy Consumption, Industrial Ventilation/Sustainability (Also fits nicely in Las Vegas Track)	Gang Tan	Jamie Bennett Yan Chen Leon Wang Ahmed Megri Jim Bradford
Seminar	Modeling the Personal Microenvironment (Also Jenson, Peter Nielsen, Yan, Kato) (Considered but not submitted for Orlando)	Ez Khalifa	Ez Khalifa Arsen Melikov Shinsuke Kato Atila Novoselac
Seminar	Heating in Cold Climate in Residential and Commercial Applications (Submitted for Orlando)	Reza Ghias	Atila Novoselac Mike Koupriyanov Mahroo Eftekhari
Seminar	Renewable Energy Systems and Net Zero Buildings (Track 8?)	Wangda Zuo	Xudong Yang Ulrike Passe Maria Todorovic
Workshop	Practical Use of CFD for Everyday Design of the Built Environment (Re-submission) (Not submitted for Orlando?)	Jim VanGilder	Mike Koupriyanov Shan He (Ulrike Passe) Reza Ghias Mark Seymour

<b>ASHRAE Las Vegas, Winter 2017</b>			
<b>Session Type</b>	<b>Session Title</b>	<b>Session Chair</b>	<b>Contributing Authors</b>
Seminar	Accuracy/validation. How much accuracy do you need? It depends on your application. CFD in Dangerous Hands (CFD NC17 Edition) “Garbage in, garbage out: avoiding”		Reza Ghias Shichao Liu Mike Koupriyanov Malcolm Cook Yan Chen Mark Seymour Jim VanGilder
Seminar	Hybrid Ventilation, Mixed Mode cooling	John Sullivan	Malcolm Cook Gang Tan

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Seminar	CFD for Design Optimization (Room scale) Parametric Modeling/Optimization	Mike Koupriyanov	Reza Ghias Jim VanGilder Charlie Lin Anthony Fontonini Mark Seymour
Seminar	Inverse Design of Indoor Environment for comfort and air quality	Wangda	John Zhai Tim Teng Fei Yan Chen
	Data Center Modeling (Maybe TC9.9 with TC4.10 co-sponsor for St. Louis)		Jim VanGilder Mark Seymour Charlie Lin
Seminar	(Pushing the Boundaries of Design) Displacement and natural convection Ventilation in High Heat gain Applications (Any interest?)	Mike K	Mike Koupriyanov John Sullivan Malcom Cook

**Guideline 33** (Mike Koupriyanov)

Guideline on how to conduct the CFD simulation for built environment. It is still up to date and there is no need to update it.

**Deadlines**

Conference	Type	Seminar	Conference Paper Abstract	Full Technical Paper	Final Conference Paper
<b>St. Louis 2016</b>	Summer	Feb 8, 2016	Sep 14, 2015	Feb 15, 2016	Jan 4, 2016
<b>Las Vegas 2017</b>	Winter	Aug 2016	Mar 2016	April 2016	Jul 2016
<b>Long Beach 2017</b>	Summer	Feb 2017	Sep 2016	Feb 2017	Jan 2017

**St. Louis 2016 – Tracks**

- Track 1: Advances in Refrigeration Systems and Alternative Refrigerants
- Track 2: Research Summit
- Track 3: Fundamentals and Applications
- Track 4: HVAC Systems and Equipment
- Track 5: Smart Building Systems/Remote Monitoring and Diagnostics
- Track 6: Indoor Environment: Health, Comfort, and Productivity
- Track 7: Professional Skills Beyond Engineering
- Track 8: Renewable Energy Systems and Net Zero Buildings

**Las Vegas 2017 – Tracks**

- Track 1: Fundamentals and Applications
- Track 2: HVAC&R Systems and Equipment
- Track 3: Water-Energy Nexus
- Track 4: Commercial and Industrial IAQ
- Track 5: Mission Critical Design and Operation
- Track 6: Effects of Climate Change on HVAC&R
- Track 7: Energy Efficient Industrial Buildings
- Track 8: Building Operation and Performance

**Web site activity** (Atila Novoselac):

- ASHRAE updated the TC websites

**Report of relevant activities in other TCs**

- TC1.2 *Instruments and Measurements* - Arsen Melikov
- TC2.1 *Physiology and Human Environment* – Arsen Melikov, Ray Horstman
- TC2.3 *Gaseous Air Contaminants/Removal Equipment*
- TC2.4 *Particulate Air Contaminants/Removal Equipment*
- TC4.3 *Ventilation Requirements and Infiltration* – Leon Wang
- TC4.7 *Load Calculation and Energy Modeling*
- TC5.3 *Room Air Distribution* - John Zhai
- TC5.6 *Control of Fire and Smoke* – Kai Kang
- TC5.8 *Industrial Ventilation* –Jamie Bennett
- TC9.3 *Transportation* - Ray Horstman
- TC9.6 *Healthcare Facilities* – James Mcneil
- TC9.9 *Mission Critical Facilities* – Jim VanGilder

**Honors and Awards (Ray Horstman)**

- o Chao-Hsin Lin will take place as the Chair for the Honors and Awards.

**New Business**

None.

**Agenda Suggestions for Next Meeting**

None.

**Call to adjourn by chair:** (Atila Novoselac) at 4:15 p.m. Vote 8-0-0.

**RP-1765 PES**

An executive meeting was hold after the main meeting. The vice-chair and 6 voting members who has no conflict of interests participated in the meeting. The PES made a recommendation of the contractor of RP-1675 to the voting members. After discussion, the TC 4.10 voted to approve the recommendation of the PES.

**APPENDIX A: DESCRIPTION OF TC’S SCOPE (FROM WEBSITE)**

TC 4.10 is concerned with developing, evaluating and recommending procedures for predicting indoor environmental conditions including thermal, acoustical, illumination, and air quality for new or existing buildings.

**Appendix B: Attendance list**

<b>Name</b>	<b>Status</b>
James Bennett	Corresponding Member
Reza Ghias	Corresponding Member
Jim VanGilder	Voting Member
Mike Koupriyanov	VC Chair
Cheng-Xian (Charlie) Lin	Research Chair,
Mahroo eftekhari	Provisional Corresponding Member
Malcolm Cook	Voting Member
Yan Chen	Corresponding Member
Ulrike Passe	Corresponding Member
John Zhai	Voting Member
Xudong Yang	Voting Member

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Ray Horstman	Corresponding Member
Chao-Hsin Lin	VM, Honors and awards chair
Donghyun Rim	Corresponding Member
Tengfei (Tim) Zhang	Corresponding Member
Sajith Wijesuriya	Visitor
Parichehr Salimifard	Visitor
mo hosni	Voting Member
Martin Sello	Visitor
Mikael Salonvaara	Visitor
Mladen Habensus	Visitor
Wayne Kraft	Visitor
Keith Robinson	Visitor
Wei Tian	Visitor
Wangda Zuo	Voting Member
Ray Sinclair	Corresponding Member
Atila Novoselac	Chair, Voting Member
Artem Zhukov	Visitor