

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

1791Tullie Circle, NE / Atlanta, GA30329
 (404) 636-8400

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.:	4.10		TC/TG/TRG TITLE:	INDOOR ENVIRONMENTAL MODELING			
DATE OF MEETING:	January 28, 2013		LOCATION:	Dallas, TX			
DATE ISSUED:	March 31, 2013		RECORDED BY:	Atila Novoselac			
VOTING MEMBERS	TERM		PRESEN T	OFFICERS		TERM	
	On	Off				On	Off
Srebric, Jelena	09	13	X	Chair	VanGilder, James	11	13
Chen, Qingyan (Yan)	09	13	X	Vice Chair	Bennett, Jamie	11	13
Kato, Shinsuke (Intl.)	09	13	✓	Secretary	Novoselac, Atila	11	13
Bennett, Jamie	11	15	X	Programs	Koupriyanov, Mikhail	12	N/A
Horstman, Ray	11	15	✓	Research	Srebric, Jelena	06	N/A
VanGilder, Jim	11	15	✓	Handbook	Banks, David	05	N/A
Sanchez, Greg	11	15	X	Membership	Wang, Liangzhu (Leon)	11	N/A
Wang, Liangzhu (Leon)	11	15	✓	Standards	Ensor, David	05	N/A
Banks, David	11	15	X	Web Page	Dols, William (Stuart)	07	N/A
Yang, Xudong	12	16	✓	Honors and Awards	Horstman, Ray	05	N/A
Khalifa, Ezzat	12	16	✓	ALI	Zhai, John	04	N/A
Zuo, Wangda	12	16	✓				

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

MEMBERS	PRESENT	MEMBERS	PRESENT
Adams, Eric	✓	Hernandez, Mark	
Al-Alusi, Thamir		Hirnikel, Daniel	
Anderson, Ren		Horstman, Raymond	✓
Arens, Edward		Hosni, Mohammad	✓
Armstrong, Peter		Int-Hout, Daniel	
Axley, James		Jeffers, Gregory	
Baker, A		Jin, Mingang	
Banks, David		Jones, Gordon	
Barakat, Sherif		Jones, Robert	
Barles, Pierre		Kang, Kai	
Beausoleil-Morrison, Ian		Karava, Panagiota	
Becker, Bryan		Kato, Shinsuke	✓
Bennett, James		Kelso, Richard	
Berkoe, Jonathan		Kerr, Carolyn	
Blackmore, Byron		Khalifa, Ezzat	✓
Chai, John		Kim, Man-Hoe	
Chakroun, Walid		Kirkpatrick, Allan	
Chen, Chun		Knappmiller, Kevin	
Chen, Qingyan(Yan)		Knight, Kelly	
Christianson, Leslie		Kolesnikov, Alexy	
Clark, Daniel		Koupriyanov, Mikhail	✓
Colliver, Donald		Krafthefer, Brian	
Cook, Malcolm	✓	Lavedrine, Isabelle	
Cui, Jie		Lebbin, Paul	
Culp, Charles		Levin, Hal	
DeGraw, Jason	✓	Lin, Chao-Hsin	✓
Djunaedy, Ery		Lin, Cheng-Xian	✓
Dobbs, Gregory		Macdonald, Iain	
Dols, William		Manning, Andy	
Emmerich, Steven		McNeill, James	
Englert, Brian		Melikov, Arsen	
Ensor, David		Meng, Lingjun	
Gadgil, Ashok		Murakami, Shuzo	
Ghia, Urmila		Musser, Amy	✓
Gordon, Elliott		Nawrocki, Tracey	
Grimsrud, David		Nielsen, Peter Vilhelm	
Grot, Richard		Novoselac , Atila	✓
Guan, Yanzheng		Offermann Francis	
Haghighat, Fariborz		Olesen, Bjarne Wilkens	
Hall, John		Pei, Hsien-Sheng	
Hensen, Jan		Petersen, Ronald	
Peterson, Janice		Tzempelikos, Athanasios	

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Phillips, Duncan		VanderMeulen, Paul	
Rahai, Hamid		VanGilder, James	✓
Rimmer, Julian		Von Kempster, Diotima	
Rivers, Richard		Walton, George	
Rogers, Lisa		Wang, Liangzhu	✓
Sanchez, Greg		Wang, Xinlei	
Sawachi, Takao		Waring, Michael	
Schwarz, Walter		Wark, Christopher	
Seppanen, Olli		Willman, Alexander	
Sestak, George		Yang, Xudong	✓
Shaw, Chia-Yu		Yoshizawa, Susumu	
Sinclair, Ray		Zhai, Zhiqiang	✓
Sleiti, Ahmad		Zhang, Dexian	
Sohn, Chang		Zhang, Jianshun	
Srebric, Jelena		Zhang, Tengfei (Tim)	
Tan, Liangcai		Zhang, Wei	
Teichman, Kevin		Zhang, XuanHang (Simon)	
Tompkins, Dean		Zhang, Yuanhui	
Topp, Claus		Zhang, Zhao	
Tronville, Paolo		Zuo, Wangda	✓
Tully, Bradley			

ADDITIONAL ATTENDANCE

Liu, Shichao			
Navaz, Homayun			

Society Liaisons, etc.

PRESENT

LeViseur, Suzanne	TAC Section Head		
Meredith, David	Prof. Devt. Committee		
Henderson, Hugh	Research Liaison		
Reeves, George	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	✓	
Bilderbeck, Mike	TAC Section 4 Head	✓	

Call to order - Chairman: (Jim Van Gilder) at 2:16 p.m.

Welcome and Introductions

Roll call (Leon Wang) – voting members

VanGilder, Jim	Yes	Horstman, Ray	Yes
Chen, Qingyan (Yan)	No	Srebric, Jelena	No
Khalifa, Ezzat	Yes	Wang, Liangzhu (Leon)	Yes
Bennett, Jamie	No	Banks, David	No
Zuo, Wangda	Yes	Kato, Shinsuke (Intl.)	No (joined at 3 pm)
Sanchez, Greg	No	Yang, Xudong (Internat.)	Yes

6//10: Six out of ten non-international voting members.
Chair, Jim VanGilder, counted for quorum. **Quorum achieved!**

Non-voting officers present: Atila Novoselac (Secretary), John Zhai (ALI)

Chair, Jim VanGilder, points out attendance issue and downsizing in voting members and recent changes due to the poor attendance

Discussion and comments on minutes from the last ASHRAE meeting in San Antonio
Call Approval of San Antonio minutes

Vote: (6-0-0-10)
San Antonio minutes approved!

Announcements (Jim VanGilder)

1. Hightower award given to Lucas Hyman of TC1.10 (Cogeneration Systems).
2. Roster update: new roster covering 2013-2014 society year will take effect July 1, 2013.
3. New TAC presentation template for TC members to use for local Chapter presentations. Will be posted on Technical Committee page after Dallas meeting.
4. Employment discipline added to ASHRAE bio online form. Members can go to <https://eweb.ashrae.org/eweb/DynamicPage.aspx?Site=ASHRAE&WebKey=8396a37a-9fc2-4f50-9332-5eebebe73494> and enter their info.
5. Third Electronic and Present (E&P) beta test at Dallas meeting (7 TCs).
6. New TC Activity Reporting form in use as of Dallas.
7. TC Master Calendar now available through Google. Just add the calendar from techservices1791@gmail.com to your own Google Calendar settings.
8. CEC is still looking for qualified session chairs and paper reviewers. Thanks to all who have volunteered so far.
Comments:
 - i. Wangda Zuo: paper chair requires more work
 - ii. John Zhai: slow response due to review's lack
9. Starting in Dallas, Speaker registration fee is now \$95.

10. Denver conference will have a special emphasis on research. Up to 25% of program will be dedicated to this. About 100 papers have been received. Seminars must be submitted by Feb 11.
11. ASHRAE can assist with logistics for web-based subcommittee meetings.
12. Congratulations to Ray Horstman who has been made fellow.
13. Congratulations to Panagiota Karava of Purdue – New Investigator Award.

Membership (Leon Wang)

- Changes in officers since Summer 2012 Meeting:
 - Mike Koupriyanov become program officer instead of Julian Rimmer
- Changes in voting membership from Summer 2013 Meeting:
 - Rolling off: Stuart Dols, Amy Musser
 - Rolling on: Xudong Yang, Ezzat Khalifa, Wangda Zuo
 - The new voting member list after the summer 2013 meeting (11 + 2):
 - Jim VanGilder, Jamie Bennett, Atila Novoselac, Liangzhu (Leon) Wang, Ray Horstman, David Banks, John Zhai, Chengxian (Charlie) Lin, Mo Hosni, Wangda Zuo, Ezzat Khalifa
 - Non-quorum Voting members: Xudong Yang, Malcolm Cook
- Changes in officers from Summer 2013 Meeting:
 - Secretary Jamie Bennett became Chair
 - Secretary Atila Novoselac become Vice Chair
 - Leon Wang became Secretary
 - Chengxian (Charlie) became Membership Chair (instead of Leon Wang)
 - Wangda Zuo became Research Chair (instead of Jelena Srebric)
 - James Lo become Handbook Subcommittee Chair (instead of David Banks)

Research (Jim VanGilder in name of Jelena Srebric)

The research subcommittee met on Sunday (01/27) from 5:00 to 6:00 pm. There were 16 attendees in the meeting.

Revolving submission deadlines: May 15th, August 15th, and December 15th.

- Current RP reports
 - PMS of RP 1512 (CFD resources for particle modeling)
 - PI expressed desire for no cost extension to address the reviewer comments
- Call to approve 3 month no-cost extension to finalize the report for RP-1512
Vote: (6-0-0-10) No-cost extension Approved.
- PS of RP 1458-RP (Modeling Person-to-Person Contaminant Transport in a Mechanically Ventilated Room) meet on Sunday from 2:30-3:30. PMS members Chao-Hsin Lin reported on the project. On schedule and satisfied PMS.
- Work Statements:
 - None at this time.
 - Current RTARs:
 - 1562-RTAR (Development of Boundary Models for Particulate Matters Deposition at Solid Surfaces of Indoor Environment). Wangda will revise RTAR for the next deadline (or consider dropping).

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- 1675-RTAR (Experimental Benchmark Data for Data Center Numerical Modeling) Jim prepared the RTAR but 2nd RTAR was returned by RAC. Jim will review concerns with RAC and bypass RTAR in order to submit Work Statement by May 15th deadline
- New RTARs:
 - Guidelines for the Accurate Use of CFD for Modeling Naturally Ventilated Indoor Spaces” Malcolm Cook and Panagiota Karava continue their work on RTAR for May 15th deadline. James Lo will help with this effort.
 - Need to follow up with Michael Waring who volunteered to prepare an RTAR on Modeling Surface Sorption.
 - Ray Horstman to prepare initial version of RTAR related to “ CFD Prediction of Sparse Particle Distributions” New ideas developed during the research meeting.
- Co-sponsored projects:
 - RP-1675 is co-sponsored by TC9.9

Current Status of TC 4.10 RTARs, WSs, and Projects.

Projects	PMS	Title	Status
1512-RP	Jamie Bennett PMS Chair	CFD Resource Decisions in Particle Transport Modeling, PI: Atila Novoselac	● Project end date is now April 30, 2013 after 3-month extension
1458-RP	Julian Rimmer PMS Chair	Modeling Person-to-Person Contaminant Transport in a Mechanically Ventilated Room, PI: Yan Chen	● A presentation was made of progress to date in Dallas ● Project is on track for completion December 31, 2013.
Bidding	PMS	Title	Status
We have no projects out for bid at this time.			
WSs	Author(s)	Title	Status
We have no Work Statements at this time.			
RTARs	Author(s)	Title	Status
1675-RTAR	Jim VanGilder	Experimental Benchmark Data for Data Center Numerical Modeling	● 2 nd RTAR was returned by RAC ● Will review concerns with RAC and bypass RTAR in order to submit Work Statement by May 15 th deadline
1562-RTAR	Wangda Zuo	Development of Boundary Models for Particulate Matters Deposition at Solid Surfaces of Indoor Environment	● Will revise RTAR for Dec 15th deadline (or consider dropping) ● Possible co-author joining Wangda
New	Malcolm Cook (Panagiota Karava, and James Lo)	Guidelines for the Accurate Use of CFD for Modeling Naturally Ventilated Indoor Spaces	● Will submit RTAR by My 15 th deadline
New	Ray Horstman	CFD Prediction of Sparse Particle Distributions	● New idea discussed in Dallas
New	Michael Waring	Modeling Particulate Surface Sorption	● Needs a additional volunteer if still of interest
Co-Sponsor	TC	Title	Status
RP-1675 is co-sponsored by TC9.9			

List of recently finished projects by TC 4.10

- 1487-RP “Developing Rack Boundary Conditions for CFD Modeling,” PI: John Zhai, January 2012
- 1321-RP “Modeling VOC Sorption of Building Materials and Its Impact on Indoor Air Quality - Phase II (second phase of RP-1097),” PI: Xudong Yang, April 2010
- 1271-RP “Modeling Low Velocity Large Scale Fluctuating Flows in Ventilated Spaces at Transitional Reynolds Numbers,” PI: Yan Chen, July 2009

Handbook (Jim VanGilder in name of David Banks)

The Program Subcommittee met briefly on Sunday (01/27), from 4:30-5:00pm

- Review: in Chicago, TC 4.10 voted to continue with current fundamentals chapter. If we want to consider an Applications Chapter for 2015 we need to apply to have such a chapter created.
- On Sunday subcommittee discussed alternatives to a new Applications Chapter including placing new material in existing Chapters (working with responsible TCs) and using hyperlinks in the CD version to our current Fundamentals Chapter. Jim will arrange a conference call to discuss this before Denver.

Program (Mike Koupriyanov)

The Program Subcommittee met on Sunday (01/27), from 3:30-4:30p.

Deadlines:

Conference	Type	Seminar	Paper Abstract	Full Technical Paper	Final Conference Paper
Denver 2013	Summer	Feb. 11, 2012	Sept. 24, 2012	Sept 24, 2012	Jan. 14, 2013
New York 2014	Winter	Aug. 13, 2013	March 15, 2013	April 19, 2013	July 2, 2013

- Dallas Program (conference in progress)
 - TC 4.10 Sponsored program for the Dallas conference
 - Seminar 39: 39, "Evaluating Particle Concentration and Distribution in Industrial and Transportation Ventilation" on Tuesday, January 29, 2013.

Following program:

ASHRAE Denver, Summer 2013			
Session Type	Session Title	Session Chair	Contributing Authors
Seminar	Modeling Industrial Spaces	Chao-Hsin Lin	Yan Chen Mike Koupriyanov Jamie Bennet
Conference Paper	Modeling Thermal Comfort in the Indoor Environment	Mike Koupriyanov	Ery Djunaedy Leon Wang Malcolm Cook
Seminar	Design and Performance Evaluation for Buildings with Natural Ventilations – Part 1	Wangda Zuo	Samuel Brunswick Narija Todorovic Andrew Persily Malcolm Cook
Seminar	Design and Performance Evaluation for Buildings with Natural Ventilations – Part 2	Wangda Zuo	Leon Glicksman Michael Wetter Panagiota Karava
Seminar	Modeling Transient Airflows	Amy Musser	Simon Zhang Mike Koupriyanov James Lo

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Seminar	Reduced Order Modeling Leon will follow-up with authors	Leon Wang	Mingang Jin Jim VanGilder Xudong Yang
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ASHRAE New York, Winter 2014			
Session Type	Session Title	Session Chair	Contributing Authors
Conference Paper	Airflow Modeling on the Cheap (Open Source etc) resource optimized CFD	Jim VanGilder	Jason DeGraw James McNeil Leon Wang
Conference Paper	Data Centers Jim will follow-up with authors, co-sponsor with TC9.9	Jim VanGilder	Shaun Fitzgerald David Banks John Zhai Ezzat Khalifa
Conference Paper	CFD in Healthcare	Wangda Zuo	Mike Koupriyanov Malcolm Cook Jamie Bennet John Zhai
Conference Paper	Air/Contaminant Flow in Personal Microenvironment and PV Systems Ezz to follow-up with authors	Ezzat Khalifa	Ezzat Khalifa Arsen Melikov Peter Nielsen Shinsuke Kato Ed Arens (CBE)

New Ideas for Papers, Seminars			
Session Type	Session Title	Session Chair	Contributing Authors
GPI	Ventilation Energy Consumption, Industrial Ventilation/Sustainability	TBA	TBA
GPI	Heating in Cold Climates	TBA	TBA

Denver 2013 - Tracks

- Track 1: Research- "Above & Beyond"
- Track 2: Integrated Project Delivery (mini-conference)
- Track 3: Building Energy Modeling vs. Measurement & Verification- Closing the Gap
- Track 4: Mile-High Efficiency & Equipment
- Track 5: Renewable & Alternative Energy Sources
- Track 6: HVAC&R Systems & Equipment
- Track 7: HVAC&R Fundamentals & Applications

Standards/Guidelines (Jim VanGilder in name of Jim David Ensor).

- Discussion and comment on standard GPC23.
 - Amy and Stuart were working on it – currently standard is out for review. Amy to send to all interested members.

Web site activity (Jim VanGilder in name of Stuart Dols):

No change.

Report of relevant activities in other TCs

- TC1.2 *Instruments and Measurements* - Arsen Melikov
- TC2.1 *Physiology and Human Environment* - Diotima Von Kempski

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Ray attended the TC 2.1 meeting: modeling of multi zone body
TC2.3 *Gaseous Air Contaminants/Removal Equipment* - Gemma Kerr
TC2.4 *Particulate Air Contaminants/Removal Equipment* - Dave Ensor
TC4.3 *Ventilation Requirements and Infiltration* – Leon Wang
TC4.7 Load Calculation and Energy Modeling - need for a new representative
TC5.3 *Room Air Distribution* - John Jenssen
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)

No discussion. (Discussed at the beginning of the meeting).

New Business

None.

Agenda Suggestions for Next Meeting

Same.

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.