

**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:	June 30, 2014		LOCATION:	Seattle WA			
DATE ISSUED:	July 30, 2014		RECORDED BY:	Atila Novoselac			
VOTING MEMBERS	TERM		PRESENT	OFFICERS		TERM	
	On	Off				On	Off
Bennett, Jamie	11	15	✓	Chair	Bennett, Jamie	13	15
Horstman, Ray	11	15	✓	Vice Chair	Novoselac, Atila	13	15
VanGilder, Jim	11	15	✓	Secretary	Novoselac (acting)	13	14
Wang, Liangzhu (Leon)	11	14	✓	Programs	Koupriyanov, Mikhail	12	N/A
Yang, Xudong	12	16	✓	Research	Zuo, Wangda	06	N/A
Khalifa, Ezzat	12	16	X	Handbook	Lo, James	13	N/A
Zuo, Wangda	12	16	✓	Membership	Lin, Charlie	13	N/A
Atila Novoselac	13	17	✓	Web Page	Lo, Jame	13	N/A
Malcolm Cook	13	17	✓	Honors and Awards	Horstman, Ray	05	N/A
Zhai, John	13	17	✓	ALI	Zhai, John	04	N/A
Lin, Chengxian (Charlie)	13	17	✓				
Hosni, Mohammad (Mo)	13	17	X				

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

ATTENDANCE			
MEMBERS	PRESENT	MEMBERS	PRESENT
Atila Novoselac	✓	Carolyn M L Kerr	
Cheng-Xian Lin	✓	Man-Hoe Kim	
Malcolm John Cook		Allan T Kirkpatrick	
Mohammad H Hosni		Kevin D Knappmiller	
James W VanGilder	✓	Kelly J Knight	
Zhiqiang Zhai	✓	Alexy Kolesnikov	
Wangda Zuo	✓	Mrs Isabelle A Lavedrine	
Xudong Yang	✓	Hal Levin	
H Ezzat Khalifa		Chao-Hsin Lin	✓
Raymond H Horstman	✓	Cheng-Xian Lin	
Liangzhu Wang	✓	SHICHAO LIU	✓
James S Bennett	✓	Iain A MacDonald	
Jose Luis Correa		Andrew P Manning	
Ghani Ramdani		James McNeill, Jr	
William S Dols		Arsen K Melikov	
David S Ensor		Lingjun Meng	
Mikhail Koupriyanov		Shuzo Murakami	
James Lo		Amy B Musser	
Eric W Adams		Peter Vilhelm Nielsen	
Thamir R Al-Alusi		Bjarne Wilkens Olesen	
Peter R Armstrong		Ms Ulrike Passe	✓
A J Baker		Ronald L Petersen	
David Banks		Ms Janice C Peterson	
Sherif Barakat		Duncan A Phillips	
Ian Beausoleil-Morrison		Hamid Rahai	
Bryan R Becker, P.E.		Julian Rimmer	
Jonathan M Berkoe		Richard D Rivers	
Byron P Blackmore		Ms Lisa J Rogers	
John C Chai		J Greg Sanchez	
Walid Chakroun		Takao Sawachi	
Chun Chen		Walter R Schwarz	
Qingyan (Yan) Chen		George J Sestak	
Daniel R Clark		Mark James Seymour	
O Sandro Tavares Conceição		Ray Sinclair	
Jie Cui		Ahmad K. Sleiti	
Charles H Culp III		Chang W Sohn	
Jason W DeGraw		Jelena Srebric	
Ery Djunaedy		Liangcai Tan	
Gregory M Dobbs		Kevin Y Teichman	
Steven J Emmerich		Dean T Tompkins	

Technical Committee 4.10 – Indoor Environmental Modeling
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Brian Carl Englert		Claus Topp	
Elliott B Gordon		Paolo M Tronville	
David T Grimsrud		Bradley Tully	
Richard A Grot		Athanasios Tzempelikos	
Yanzheng Guan		Paul R VanderMeulen	
Fariborz Haghghat		Mrs Diotima A Von Kempfski	
John D Hall		George N Walton	
Jan L M Hensen		Xinlei Wang	
Mark Hernandez		Michael S Waring	
Daniel J Hirnikel		Christopher G Wark	
Daniel Int-Hout, III		Alexander Willman	
Gregory R Jeffers		Dexian Zhang	
Mingang Jin		Jianshun S Zhang	
Gordon G Jones		Tengfei (Tim) Zhang	
Mrs Tracey Nawrocki Jumper		Wei Zhang	
Kai Kang		XuanHang Zhang	
Panagiota Karava		Yuanhui Zhang	
Shinsuke Kato		Zhao Zhang	
Richard M Kelso			

ADDITIONAL ATTENDANCE

Reza Ghias	Mathew Dahlhausen	AJ Rao	Shichao Liu
Susan Hayes	Yang Wang	Jiyiing Liu	Atefeh Mohammadpour
Amin Engarnevis	Ruoyu You	Guiyuan Han	
Justin Nekam	Jianjun Hu	Guangyu Cao	

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 by Chairman: (Jamie Bennett) at 2:15 p.m.

Welcome by Jamie Bennett

Self-Introductions of attendees

Roll call (Charlie Lin) – voting members

Bennett, Jamie	Yes	Zuo, Wangda	Yes
Horstman, Ray	Yes	Atila Novoselac	Yes
VanGilder, Jim	Yes	Malcolm Cook (internat.)	Yes
Wang, Leon	Yes	Zhai, John	Yes
Yang, Xudong (internat.)	Yes	Lin, Charlie	Yes
Khalifa, Ezzat	No	Hosni, Mo	No

Attendance

- **8 of 10** non-international voting members were present
- **2 of 2** international voting members was present
- **Quorum achieved** without counting the Chair
- Non-voting officers present: None

Minutes from New York meeting

- Discussion and comments on
- Call Approval of New York minutes
 - **Vote: (9-0-1-10)**
 - **New York minutes approved**

Announcements (Jamie Bennett)

- Discussion and appreciation for Chao Lin's Boeing Tour
- Listing of program tracks for Chicago
- Announcement of Mikhail Koupriyanov as new Secretary
 - Jim Van Gilder accepted as Program Chair

Membership (Charlie Lin)

- Changes in Voting Members (effective July 2014, After Summer 2014 meeting)
 - Rolling off: Leon Wang
 - Rolling on: James Lo, Mikhail Koupriyanov

Research (Wangda Zuo)

The research subcommittee met on Sunday (06/29) from 5:00-6:00 pm. There were 19 attendees.

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

Current RP reports

- None at this time.

Work Statements

- 1675-WS (Experimental Benchmark Data for Data Center Numerical Modeling) Jim prepared the WS but bypassing the RTAR. Mark will attend the meeting on Wednesday with RAC to check the details.

New RTARs

- “Guidelines for the Accurate Use of CFD for Modeling Naturally Ventilated Indoor Spaces”
 - Malcolm Cook’s RTAR was voted 9-0-1-10 for TC support
- “CFD Prediction of Sparse Particle Distributions”
 - Ray Horstman to revise draft RTAR using new format, re Xudong’s suggestion

Co-sponsored projects

- RP-1675 is co-sponsored by TC9.9

Current Projects

Projects	PMS	Title	Status
No projects out for bid at this time			

Proposals in Progress

Type	Designation	Author(s)	Title	Status
WS	1675	Jim Van Gilder Mark Seymour	Experimental Benchmark Data for Data Center Numerical Modeling	In draft after RAC comments. Target submittal date of Dec. 15.
RTAR	N/A	Malcolm Cook Panagiota Karava James Lo	CFD Boundary Conditions for Modeling Naturally Ventilated Indoor Spaces	TC voted to support
RTAR	N/A	Ray Horstman	CFD Prediction of Sparse Particle Distributions	Ray is reformatting

External Requests

- Co-sponsored RTAR (TC 9.6) “Improving Hospital Operating Room Air Distribution using Alternative Unidirectional Diffusers and Air Curtain Systems”
- Possible co-sponsorship of RTAR (TC 4.7) “Assess and implement natural and hybrid ventilation models in whole-building energy simulations” – needs TC vote

New Ideas

- Radiation model in CFD, possible co-sponsorship from TC 2.1. (Mike Koupriyanov)
- Benefit of Embedding CFD into everyday design process. (James Lo)

Handbook (James Lo)

The Handbook Subcommittee met on Sunday (06/29) from 4:30-5:00pm

1. We were not successful in completing the application chapter before the due date for the 2015 revision due to the time constraint. Since when the chapter was approved by the handbook committee for the 2015 or 2019 edition, we will now submit this new chapter in the 2019 edition (due July 2018).
2. The handbook editor, Mark Owens, confirmed that as soon as we complete the chapter (presumably sometime next year), this new chapter will be added to the online handbook as "upcoming new material", but won't be treated as the official handbook chapter until it's in print.
3. Our current deadline for updating fundamental chapter is 5/17/2016. During the subcommittee meeting, Jim suggested we update some of the older material, especially with newer technique such as FFD worked on by Wangda. James will think about the revision topics and solicit writers during the Chicago meeting. (Please ask for ideas)
4. It was discussed and suggest that the application chapter to include 4 specific examples (due to the page limit). 1. Typical mechanical ventilation in a room, 2. Data center design (Jim V, Mark S.), 3. Displacement ventilation (Mikhail K) and 4 Natural ventilation (Malcolm C).
5. We plan to provide the animation and graphics for these examples on the web only contents, corresponding to the new online "interactive" version of the handbook when its available/launched.

Program (Mike Koupriyanov)

The Program Subcommittee met on Sunday (06/29) from 3:30-4:30pm.

ASHRAE Seattle, Summer 2014 – Accepted Sessions			
Session Type	Session Title	Session Chair	Contributing Authors
Seminar	Advances in Simulation Research for the Design and Operation of Natural and Mixed Ventilation Systems (Seminar 11)	Wangda Zuo	James Lo Marija Todorovic Malcolm Cook Panagiota Karava
Seminar	Modeling Industrial Spaces (Seminar 46)	Chao-Hsin Lin	Yan Chen Reza Ghias Jamie Bennet

ASHRAE Chicago, Winter 2015			
Session Type	Session Title	Session Chair	Contributing Authors
Workshop	Practical Use of CFD for Everyday Design of the Built Environment	Mike Kourpiyanov	Reza Ghias Byron Jones Gursaran Mathur Shan He
Seminar	Ventilation Energy Consumption, Industrial Ventilation/Sustainability	Ray Sinclair	Jamie Bennet Yan Chen Panagiota Karava (tentative)
Seminar	CFD in Healthcare (potential co-sponsorship with 9.6)	Wangda Zuo	Malcolm Cook Ken Mead John Zhai

ASHRAE Atlanta, Summer 2015			
Session Type	Session Title	Session Chair	Contributing Authors
Seminar	Alternative/Open Source CFD Modeling Tools	Chao Hsin-Lin	Charlie Lin Wangda Zuo Jim VanGilder James Lo
Conference Paper	Moisture Modeling (seek co-sponsorship from TC 1.12, 4.4 Envelope)	Jonathan Sullivan	Atila Novoselac Mark Seymor
Seminar	Maintaining IAQ in Low Energy Buildings (chilled beams, DV, natural/mixed mode)	Wangda Zuo	Malcolm Cook Mike Koupriyanov

Deadlines

Conference	Type	Seminar	Conference Paper Abstract	Full Technical Paper	Final Conference Paper
Chicago 2015	Winter	Aug. 11, 2014	Mar. 24, 2014	Apr. 14, 2014	Jul. 7, 2014
Atlanta 2015	Summer	Feb. 9, 2015	Sept. 22, 2014	Sept. 22, 2014	Jan. 5, 2015
Orlando 2016	Winter	TBD	TBD	TBD	TBD
St. Louis 2016	Summer	TBD	TBD	TBD	TBD

Chicago 2015 – Tracks

- Track 1: Systems and Equipment
- Track 2: Fundamentals and Applications
- Track 3: Industrial Facilities
- Track 4: Large Buildings: Mission Critical Facilities and Applications
- Track 5: Energy Efficiency
- Track 6: Life Safety
- Track 7: Design of Energy and Water efficient Systems
- Track 8: Hospital Design and Codes

Atlanta 2015 – Tracks

- Track 1: Systems and Equipment
- Track 2: Fundamentals and Applications
- Track 3: Research Summit
- Track 4: Refrigeration
- Track 5: Building Operation, Maintenance and Optimization/Commissioning
- Track 6: Indoor Air Quality
- Track 7: Modeling throughout the Building Life Cycle
- Track 8: High Performance Buildings
- Track 8: Moving Advanced Energy Design Guidance to the Mainstream

Web site activity (James Lo):

- The website needs a major update.
 - Discussion about developing communication over the ASHRAE TC4.10 website and opening it for public access.
 - Identified potential issues about privacy and someone posting inappropriate content. Concluded that the Idea is good but needs further refinement.

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 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)

None.

New Business

None.

Agenda Suggestions for Next Meeting

None.

Call to adjourn by chair: (Jamie Bennett) at 4:15 p.m. Vote 10-0-0-12.

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.