AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS, INC.
1791 Tullie Circle, NE / Atlanta, GA 30329
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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.:	**4.10**	TC/TG/TRG TITLE:	**INDOOR ENVIRONMENTAL MODELING**
DATE OF MEETING:	January 31, 2011	LOCATION:	Las Vegas, NV
DATE ISSUED:	March 31, 2011	RECORDED BY:	Jamie Bennett

VOTING MEMBERS	TERM		PRESENT	OFFICERS		TERM	
	On	Off				On	Off
Lin, Chao-Hsin	09	11	✓	Chair	Lin, Chao-Hsin	09	11
Chen, Qingyan (Yan)	09	13	✓	Vice Chair	VanGilder, James	09	11
Kato, Shinsuke (Intl.)	09	13	X	Secretary	Bennett, Jamie	09	11
Khalifa, H. Ezzat	07	11	✓	Programs	Rimmer, Julian	08	10
Lin, Chengxian (Charlie)	08	12	X	Research	Srebric, Jelena	06	10
Musser, Amy	09	13	✓	Handbook	Banks, David	05	10
Rimmer, Julian	07	11	X	Membership	Novoselac, Atila	09	13
Schwarz, Walter	07	11	X	Standards	Ensor, David	05	N/A
Srebric, Jelena	09	13	✓	Web Page	Dols, William (Stuart)	07	N/A
Yang, Xudong (Don) (Intl.)	07	11	✓	Honors and Awards	Horstman, Ray	05	N/A
Zhang, Yuanhui	08	12	X	ALI	Zhai, John	04	N/A

CORRESPONDING MEMBERS	PRESENT	CORRESPONDING MEMBERS	PRESENT
Abernathy, Stephen V		Jones, Robert S	
Al-Alusi, Thamir R		Kang, Kai	✓
Anderson, Ren S		Kato, Shinsuke	
Arens, Edward A		Keen, Julia A	
Armstrong, Peter R		Kelso, Richard M	
Axley, James W		Kerr, Carolyn M	
Banks, David	✓	Kim, Man-Hoe	
Bansal, Pradeep Kumar		Kirkpatrick, Allan T	
Barakat, Sherif		Knappmiller, Kevin D	
Barles, Pierre		Knight, Kelly J	
Beausoleil-Morrison, Ian		Kolesnikov, Alexy	
Becker, Bryan R		Krafthefer, Brian C	
Becker, Bryan R		Lebbin, Paul A	
Bennett, James (Jamie)	✓	Levin, Hal	
Berkoe, Jonathan M		LeViseur, Suzanne	
Blackmore, Byron P		Lin, Chao-Hsin	✓
Chakroun, Walid		Macdonald, Iain Alexander	
Chen, Qingyan (Yan)	✓	Manning, Andy	
Christianson, Leslie L		McGinn, Tim J	
Clark, Daniel R		Melikov, Arsen Krikor	
Colliver, Donald G		Murakami, Shuzo	
Cui, Jie		Musser, Amy B	✓
Dobbs, Gregory M		Nawrocki, Tracey L	
Dols, William Stuart	✓	Newman, H Michael	
Elmahdy, Hakim		Nielsen, Peter V	
Emmerich, Steven J	✓	Novoselac, Atila	✓
Ensor, David S		Olesen, Bjarne W	
Gadgil, Ashok J		Pei, Hsien-Sheng J	
Gordon, Eliott B		Petersen, Ronald L	
Grimsrud, David T		Peterson, Janice C	
Grot, Richard A		Rahai, Hamid	
Haghighat, Fariborz		Ramspeck, Claire	
Hall, John D		Rimmer, Julian	
Hensen, Jan L M		Rivers, Richard D	
Hernandez, Mark		Rogers, Lisa J	
Hirnikel, Daniel J		Sanchez, Greg	
Horstman, Raymond H	✓	Sawachi, Takao	
Int-Hout, Daniel		Seppanen, Olli A	
Jeffers, Gregory R		Sestak, George J	
Jones, Gordon G		Shaw, Chia-Yu	

Sinclair, Ray J		Wang, Liangzhu (Leon)	✓
Sohn, Chang W		Wang, Xinlei	
Srebric, Jelena		Wark, Christopher G	
Tan, Liangcai		Willman, Alexander	
Teichman, Kevin Y		Yoshizawa, Susumu	
Tompkins, Dean T		Zhai, Zhiqiang (John)	✓
Topp, Claus		Zhang, Dexian	
Tronville, Paolo		Zhang, Jianshun S	
Tully, Bradley		Zhang, Tengfei	
VanGilder, Jim	✓	Zhang, Wei	
Vandermeulen, Paul R		Zhang, Xuanhang (Simon)	✓
Vaughn, Michael R		Zhang, Zhao	
Von, Diotima A		Zuo, Wangda	✓
Walton, George N			

ADDITIONAL ATTENDANCE			
Adams, Eric	✓	Lo, James	✓
Boor, Brandon	✓	McNeill, James	✓
Clark, Jordan	✓	Passe, Ulrike	✓
Cook, Malcolm	✓		
DeGraw, Jason	✓	Peeters, Leen	✓
Djunaedy, Ery	✓	Reddy, Agami	✓
Goldstein, Kate	✓	Sinclair, Ray	✓
Hermansen, Knud	✓	Tan, Gang	✓
Karava, Panagiota	✓	Wang, Jing	✓
Karava, Panagiota	✓	Waye, Scot	✓
Koupriyanov, Mike	✓	Zhang, Li	✓
Lavedrine, Isabelle	✓		
Lee, Kisup	✓	Zhao, Lingying	✓
Liu, Shichao	✓		

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)		
Vaughn, Michael	Staff Liaison (Tech. Services)		
Conway, Mark	Handbook Liason		

Call to order - Chairman: (Chao-Hsin Lin) at 2:16 p.m.

Welcome and Introductions (Chair Chao-Hsin Lin)

Roll call (Atila Novoselac) – voting members

Chao-His Lin (Chair) **yes**	Julian Rimmer (Program) **no**	Jelena Srebric (Research) **yes**
Amy Musser **yes**	Ezzat Khalifa **yes**	Walter Schwartz **no**
Qingyan (Yan) Chen **yes**	Chengxian (Charlie) Lin **no**	Shinsuke Kato (Int.) **no**
Xudong (Don) Yang (Int.) **yes**	Yuanhui Zhang **no**	

6/11 voting members. Quorum achieved.

Non-voting officers present: Jamie Bennett (Secretary), David Banks (Handbook), Ray Horstman (Award and Honor)

Approval of last meeting minutes – vote to approve: 5-0-0-5 (chair not voting) subject to adding John Zhai as having attended in Albuquerque.

Announcements (Chao-Hsin Lin)

- At chairs' breakfast:
  - A 1.5 million ASHRAE grant through NIST was awarded to Jelena Srebric of Penn State University (and a colleague at University of Colorado) to study retail IAQ.
  - Free ALI course registration was proposed.
  - New TC: 7.2,HVAC&R Construction & Design Build Technologies.
  - Section 4 rep announced student and new faculty member funding opportunities through RAC. It is a new simplified funding mechanism for 100k.
  - RAC feels that TCs need to become more collaborative with other TCs to align with broad ASHRAE goals.
  - The issue of attendees not paying registration fees was brought up.
- There were only two program items for our TC accepted for this meeting. Jim Van Gilder suggested making personal contact with track chairs. The Fundamentals Track tends to be our track, but we should branch out to "sexier" tracks (suggested by Ez Khalifa). A sub-track on analytical tools within Fundamentals has been announced for Montreal.
- There will be no more conference themes, beginning with San Antonio.

- Jim Van Gilder and Chao-Hsin Lin recommend consideration of a TC 4.10 Google Group.

- TC websites now have a technical help section called "help wanted."

Membership (Atila Novoselac)

- Rolling off (after the Annual [Summer] Meeting): Ez Khalifa, Julian Rimmer, Walt Schwarz, Don Yang
- Rolling on (after the Annual [Summer] Meeting): Leon Wang, Greg Dobbs, Greg Sanchez, Dave Banks, Jim Van Gilder, Stuart Dolls, Ray Horstman, Jamie Bennett

Research (Jelena Srebric)

- The research subcommittee met on Sunday (01/30) at 5:00-6:30 pm. There were _22_ attendees in the meeting.
- Revolving submission deadlines: May 15th, August 15th, and December 15th.
- RP 1418 PMS met Sunday 12:30-1:30p. This project is currently in a 6-month no-cost extension. A vote for an additional 6-month extension resulted in 8 for, 0 against, with 9 VMs present and CNV.
- RP 1487 PMS met Sunday 1:30-2:30p (LVCC) N238:6-month no-cost extension vote: 8/13 (CNV).
- TC 4.10 RP 1512 PMS: Sunday 2:30-3:30p (LVCC) N238: on track
- TC 4.10 Research: Sunday 5:00-6:30p (LVCC) N238
- Work Statements: none at this time
- RTARs: some will go out by May 15, 1562, Jim will do new one: data center mock-up for experiments and validation benchmarks. Ray: proposed two projects on disease transmission in aircraft: charged particle transport and removal and in vivo response to given level of droplet exposure. Ez: papers by Ahmadi (Clarkson University) on behavior of particles in electric field. He will help Ray. Prof Wong at Minnesota will help.

Summary of Current Status for 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 The project officially started on August 1, 2010 Project end date is May 31, 2012	Second report in Las Vegas, NV
1487-RP	Jim Van Gilder (TC4.10) PMS Chair Tom Davidson (TC9.9)	The Development of Simplified Rack Boundary Conditions for Numerical Data Center Models, PI: John Zhai Original project end date is September 1, 2010 PI requested 6 months no cost extension Current project end date is March 1, 2011	Fourth report in Las Vegas, NV (final presentation) Final report will be available by June 2011
1418-RP	Chao-Hsin Lin PMS Chair	Optimizing the Tradeoffs Between Grid Resolution and Simulation Accuracy: Coarse Grid CFD Modeling, PI: John Zhai Original project end date is September 1, 2010 PI requested 6 months no cost extension Current project end date is March 1, 2011	Fifth report in Las Vegas, NV (final presentation) Final report will be available by June 2011
Bidding	**PMS**	**Title**	**Status**

1458-TRP	Julian Rimmer	Modeling Person-to-Person Contaminant Transport in a Mechanically Ventilated Room (contractor will be selected by Montreal meeting)	RAC to post for bidding in Spring 2011
WSs	**Author(s)**	**Title**	**Status**
RTARs	**Author(s)**	**Title**	**Status**
1562-RTAR	Wangda Zuo	Boundary Conditions for Particulate Contaminant Indoor Transport (Zhai, Novoselac and Wang)	RTAR feedback to Wangda Zuo by February 28, 2011
New	Malcom Cook	CFD Boundary Conditions for Natural Ventilation (time varying boundary conditions, validation with measured data)	RTAR needs work – maybe fixed geo., and specific more narrow scope
New	Jim Van Gilder	Generic representation of datacenter racks for physical laboratory and CFD simulation modeling	new
New	Ray Horstman, Ez Khalifa, and Xinlei Wang	Particle deposition, resuspension and formation under buoyancy and electrostatic forces	new
New	Ray Horstman	Particle deposition for human subjects and resultant infection modeling	new
Co-Sponsor	**TC**	**Title**	**Status**

List of recently finished projects by TC 4.10

- 1271-RP "Modeling Low Velocity Large Scale Fluctuating Flows in Ventilated Spaces at Transitional Reynolds Numbers;" PI: Yan Chen, July 2009
- 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

Handbook (David Banks)

- The Handbook Subcommittee met Sunday, 1/30/11, from 4:30-5:00p.
- Proposal to start working on an applications chapter.
- Handbook available online. Hits not being tracked (although the Handbook Chair requested this of ASHRAE).
- Amy Musser suggested that a possible role for the handbook is educating CFD customers/consumers.

Program (Julian Rimmer, reported by Jim VG)

- The Program Subcommittee met Sunday, 1/30/11, from 3:30-4:30p.
- **Las Vegas, Winter, January 29 – February 2, 2011 (conference in progress)**

- Theme: Zero Energy Design

FORMAT	TITLE	CHAIR	SPEAKERS
Conference Paper	Modeling Extreme Events	Amy Musser	John Zhai, Dave Banks, Eric Adams, Jason McGraw
Forum	Should ASHRAE Develop a Certification or Education Programs on CFD?	Amy Musser	Approximately fifteen discussants. Details are available from the session chair.

- **Montreal, Summer, June 25-29, 2011**
  - Theme: Net-Zero Buildings
  - Conference Paper Abstract/Full Technical Papers Due: September 17, 2010
  - Draft Conference Papers Due: December 17, 2010
  - Seminar and Forum Program Proposals Due: February 14, 2011

FORMAT	TITLE	CHAIR	SPEAKERS
Seminar	Modeling Large Public Spaces	Ray Sinclair	Julian Rimmer, John Zhai, Andy Manning, Greg Sanchez
Bi-Annual Conference Paper / Seminar	Innovations and Advances in Indoor Environmental Modeling Boundary Conditions	Julian Rimmer	Papers from Julian Rimmer, Michel Tardif, Yan Chen
Seminar	Do I Really Need CFD?	Jim VanGilder	Isabelle Lavedrine, Ray Sinclair, Amy Musser, Leon Wang, Jim VanGilder
Seminar	Coupling Indoor and Outdoor Environments	Jim VanGilder	Yan Chen, Leon Wang, Dave Banks/Atila Novoselac
Conference Paper	Modeling Thermal Comfort in the Indoor Environment	Julian Rimmer	Chao-Hsin Lin, Ray Horstman, Mike Koupriyanov
Seminar	Modeling Transients	Amy Musser	Simon Zhang, Julian Rimmer, Atila Novoselac

- **Chicago, Winter, January 21-25, 2012**
  - Theme: The Impact of HVAC&R on Our Daily Lives
  - Conference Paper Abstract/Full Technical Papers Due: April 2011
  - Draft Conference Papers Due: August 2011
  - Seminar and Forum Program Proposals Due: August 2011

FORMAT	TITLE	CHAIR	SPEAKERS
Seminar	Control Sensor Location and CFD	Greg Dobbs	Jelena Srebric, Julian Rimmer, Wangda Zuo
Seminar	Airflow Modeling Techniques for	John Zhai	Julian Rimmer, Leon Wang

	Net Zero Design		
Seminar	Airflow Modeling for LEED/Sustainable Design of Performing Arts Centers, Stadiums/Arenas, or Airports	Walt Schwarz	Mike Koupriyanov, Isabelle Lavedrine
Conference Paper	Air and Contaminant Flow in the Personal Microenvironment	Ez Khalifa	Don Yang, Malcolm Cook

- **San Antonio, Summer, June 23-28, 2012**

FORMAT	TITLE	CHAIR	SPEAKERS
Seminar	Getting Started with Open Source	Jim VanGilder	Leon Wang, Amy Musser, James McNeill

- **Currently Unscheduled**

FORMAT	TITLE	CHAIR	SPEAKERS
Conference Paper	Modeling Personal Ventilation Systems	Ez Khalifa	

Standards/Guidelines (Stuart Dols)

GPC 33: Documenting indoor airflow and contaminant transport modeling is meeting at 11:00 a.m. on Tuesday, February 1st.

Web site activity (Stuart Dols): not much going on.

Report of relevant activities in other TCs

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

Ray wants Boeing to fund a CFD award through TC 4.10. no funding at this time. Wants to call it Nielsen award. May seek funding through CFD vendors instead. ASHRAE commercialism policy may be a problem.

New Business

Amy Musser's forum on ASHRAE certification/education in CFD shaped some ideas and questions:

- Educate CFD consumers/certify CFD practitioners?
- What is the business advantage to ASHRAE?
- Why would they do it?
- More discussion is needed.

Agenda Suggestions for Next Meeting

Vote to adjourn, 6-0-0-6, held at 4:18.

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.