Conference programme of 12th International Manikin and Modelling Meeting at Empa, St. Gallen, Switzerland

	Wednesday 29 August 2018		Thursday 30 August 2018		Friday 31 August 2018		Saturday 1 September 2018
08:00			Welcome session	Registration and help desk		Help desk	**Post-conference hike**, meeting point at main railway station under binary clock, please, register at help desk
08:30			*Session 1* **Physiological modelling**		*Session 5* **Car seats and beds - modelling and measurements**		
09:00							
09:30							
10:00			Coffee break		Coffee break		
10:30			*Session 2* **Poster session**		*Session 6* **Comprehensive models**		
11:00							
11:30							
12:00			Lunch break		Lunch break		
12:30							
13:00							
13:30			*Session 3* **Clothing-body interaction - modelling and measurements**		*Session 7* **High heat exposures - modelling and measurements**		
14:00		Registration desk at Empa, Lerchenfeldstrasse 5					
14:30							
15:00	**Empa lab tour**, Empa, Lerchenfeldstrasse 5		Coffee break		Closing and farewell coffee break		
15:30			*Session 4* **Manikins and their applications**				
16:00							
16:30							
17:00	**St. Gallen city guided tour**, meeting point at main railway station under binary clock	Registration desk at Textile Museum, Vadianstrasse 2					
17:30							
18:00	**Welcome reception**, Textile Museum, Vadianstrasse 2		**Conference dinner**, Restaurant Marktplatz, Neugasse 2				

12th International Manikin and Modelling Meeting at Empa, St. Gallen, Switzerland 29-31 August 2018

Detailed conference programme

Thursday, 30 August 2018

8:15 - 8:30	**Welcome session**

8:30-10:00	***Session1* - Physiological modelling** Chairs: Simon Annaheim and Barbora Kopečková
8:30	Keynote speech The Virtual Population: Computational Anatomical Models for *In Silico* Dosimetry, Thermal and Neurostimulation Applications Niels Kuster[1,2], Bryn Lloyd[1,3], Esra Neufeld[1,3] *IT'IS Foundation for Research on Information Technologies in Society, Zürich, Switzerland* *ETH-Zurich, Zürich, Switzerland* *Zurich MedTech, Zürich, Switzerland*
9:15	Study of the individualization of the passive system Fiala-based human thermophysiological model Barbora Kopečková, Jan Pokorný and Miroslav Jícha *Brno University of Technology, Brno, Czech Republic*
9:30	Influence of human body geometry simplification on local heat transfer Jingxian Xu[1], Agnes Psikuta[2], Jun Li[1,3] [1]*College of Fashion and Design, Donghua University, Shanghai, China* [2]*Empa, St. Gallen, Switzerland* [3]*Key Laboratory of Clothing Design and Technology, Donghua University, Shanghai, China*
9:45	Modelling approaches for the prediction of physiological responses or health status Simon Annaheim, Agnes Psikuta, Patrick Eggenberger, Piero Fontana, René Rossi *Empa, St. Gallen, Switzerland*

10:00 - 10:30	**Coffee break**

10:30 - 12:00	***Session 2* – Poster session** Chairs: Agnes Psikuta and Róbert Toma
10:30 - 11:05 3 min per poster	Application of thermoregulation model in assessment of heat strain Qianqian Huang [1,2], Jun Li [1,2,3] [1]*College of Fashion and Design, Donghua University, Shanghai , China* [2]*Key Laboratory of Clothing Design & Technology, Donghua University, Shanghai, China* [3]*Tongji University Shanghai Institute of Design and Innovation, Shanghai, China*
	Moderating effect of clothing insulation on the relationship between physiological parameters of the elderly people and environmental temperature Yu Jiao[1], Hang Yu[1], Yifan Yu[2], Xiangyang Chu[1], Yuhua Zhu[3] [1]*School of Mechanical Engineering, Tongji University, Shanghai, China* [2]*College of Architecture and Urban planning, Tongji University, Shanghai, China* [3]*College of Civil Engineering, Tongji University, Shanghai, China*
	Contribution to the simulation of human-building interaction using artificial neural networks to predict thermal sensation Laura Baumgärtner *Institute for Architecture and Planning, University of Liechtenstein, Vaduz, Liechtenstein*
	Development of a novel hand flame manikin facility to estimate firefirghters' burn injuries Do-Hee KIM[1], Do-Hyung Kim[2], Joo-Young LEE[1,2] [1]*Research Institute for Human Ecology, Seoul National University, Republic of Korea* [2]*Department of Textiles, Merchandising and Fashion Design, Seoul National University, Republic of Korea*
	Clothing Area Factor Measurements and Estimations for Cold-Weather Clothing Timothy Rioux[1], Peng Li[2], and Xiaojiang Xu[1] [1]*United States Army Research Institute of Environmental Medicine, Natick, Massachusetts, USA* [2]*Natick Soldier Research Development and Engineering Center, Natick, Massachusetts, USA*
	Confrontation of thermal sensation and comfort models to votes in a transient thermal exposure Ilango Thiagalingam[1], Sidali Mokdad[1], Roch El Khoury[1], Thomas Tanguy[2] *1Institut VEDECOM, Versailles, France* *2Groupe PSA- Centre Technique de Vélizy A, Vélizy-Villacoublay, France*
	Determination of clothing heat transfer coefficients for use in the iHVAC system Róbert Toma, Kristýna Hrubanová, Jan Fišer, Miroslav Jícha *Brno University of Technology, Czech Republic*
10:30 - 11:05 3 min per poster	Performance attributes relevant to thermal comfort of hip protective garments Wiah Wardiningsih [1,2], Olga Troynikov[1] [1]*School of Fashion and Textile, RMIT University, Melbourne, Australia* [2]*Polytechnic of Textile Technology, Ministry of Industry, Bandung, Indonesia*
	Effect of Wearing A Bra on Upper Body Skin Temperature during Exercise Xiao-Qun Dai[1], Chun-Hui Xiang[2], and Guo-Wen Song[2] [1]*Soochow University, College of Textile and Clothing Engineering, Suzhou, China* [2]*Iowa State University, College of Human Sciences, Ames, USA*
	Human Thermal Modeling with Voxelized Body Domains Rohan Amar, Amir Bahadori, Steven Eckels *Kansas State University, Manhattan, USA*
11:05-11:15	Invitations by 12i3m sponsors Thermetrics ThermoAnalytics

12:00 - 13:30	**Lunch break**

13:30-14:45	***Session 3* - Clothing-body interaction modelling and measurement** Chairs: Xiaojiang Xu and Braid MacRae
13:30	Development of an advanced clothing moisture model Mark Hepokoski[1], Scott Peck[1], Shailesh Gupta[2], Joel Coffel[2] and Matthew Decker[2] [1]*ThermoAnalytics, Inc., Calumet, Michigan, USA* [2]*W.L. Gore & Associates, Inc., Elkton, Maryland, USA*
13:45	Mathematical formulation of sensible heat transfer in the spatially heterogeneous skin-clothing-environment system Ankit Joshi[1,2], Agnes Psikuta[1], Marie-Ange Bueno[2], Simon Annaheim[1], René M. Rossi[1] *Empa, St. Gallen, Switzerland* *2 Laboratoire de Physique et Mécanique Textiles, ENSISA, UHA, Mulhouse, France*
14:00	Simulation of temperature profiles using an anatomically correct human model Xiaojiang Xu, Michael Castellani, Timothy Rioux, Adam Potter *Biophysics & Biomedical Modeling Division, U.S. Army Research Institute of Environmental Medicine, Natick, Massachusetts, USA*
14:15	Measuring spatial and temporal changes in garment sweat absorption: comparison of gravimetric and infrared methods

	Margherita Raccuglia[1,2], Christian Heyde[2], Alex Lloyd[1], Simon Hodder[1] and George Havenith[1] *[1]Environmental Ergonomics Research Centre, Loughborough University, UK* *[2]Adidas FUTURE Sport Science Team, Herzogenaurach, Germany*
14:30	Modification by measurement: insight into local temperature disturbance when using contact skin temperature sensors Braid MacRae[1,2], René Rossi[1], Agnes Psikuta[1], Fabrizio Spano[1], Christina Spengler[2,3], Simon Annaheim[1] *[1]Empa, Swiss Federal Laboratories for Materials Science and Technology, St. Gallen, Switzerland* *[2]Institute of Human Movement Sciences and Sport, ETH Zurich, Zurich, Switzerland* *[3]Zurich Center for Integrative Human Physiology (ZIHP), University of Zurich, Zurich, Switzerland*

14:45-15:15	**Coffee break**

15:15-16:15	***Session 4*** **- Manikins and their applications** Chairs: Kalev Kuklane and Stephanie Veselá
15:15	Equivalent temperature calculation: The issue of total thermal resistance for Face and Scalp parts measured by thermal manikin Jan Fišer, Jan Pokorný, Miloš Fojtlín, Róbert Toma and Miroslav Jícha *Brno University of Technology, Czech Republic*
15:30	Low-Cost Thermal Manikin – A Competitive Instrument to Simulate Thermal Loads and to Determine Thermal Passenger Comfort Pascal Lange, Andreas Westhoff, Daniel Schmeling, Tobias Dehne *German Aerospace Center (DLR), Institute of Aerodynamics and Flow Technology, Göttingen, Germany*
15:45	A multi-sector cylinder for ISO 18640-1, specially designed for studying clothing sweat management, working in hot climates and dynamic physiological control Mark Richards[1], John Alison[1], Sushmitha Devarajan[2], Michael Bussoli[2], Robert Gathercole[3], Andreas Jack[3] *[1]www.BodySim.ch, Humanikin GmbH, Switzerland* *[2]Apparel Innovation Centre, Canada* *[3]lululemon, Whitespace, Canada*
16:00	Determination of the local evaporative resistances of two typical office clothing ensembles and the effect of air speed and body movement Stephanie Veselá[1], Agnes Psikuta[2], Arjan JH Frijns[1] *[1]Dept. of Mechanical Engineering, Eindhoven University of Technology, The Netherlands* *[2]Empa, Swiss Federal Laboratories for Materials Science and Technology, St. Gallen, Switzerland*

18:00 -21:00	**Conference dinner** (Restaurant Marktplatz, Neugasse 2) Presentation entitled **Textile tradition for high-tech applications** by René Rossi

Friday, 31 August 2018

8:30-10:00	***Session 5*** **- Car seats and beds - modelling and measurements** Chairs: Peter Bröde and Miloš Fojtlín
8:30	Predicting wetness perception on car seats Peter Bröde *Leibniz Research Centre for Working Environment and Human Factors (IfADo), Dortmund, Germany*
8:45	Visualisation of temperatures and heat fluxes in contact area of automotive seat Jan Pokorný, Jan Fišer, Róbert Toma, Miloš Fojtlín, and Miroslav Jícha *Brno University of Technology, Faculty of Mechanical Engineering, Energy Institute, Brno, Czech Republic*
9:00	Effects of seated posture and automotive seat on human thermal response Miloš Fojtlín[1,2], Agnes Psikuta[2], Jan Fišer[1], Jan Pokorný[1], Róbert Toma[1], and Miroslav Jícha[1] *[1]Brno University of Technology, Dpt. of Thermodynamics and Environmental Engin., Brno, Czech Republic* *[2]Empa, Swiss Federal Laboratories for Materials Science and Technology, St. Gallen, Switzerland*
9:15	Modelling and validation of comfort temperature for bedding system Yuping Liu[1], Yehu Lu[1, 2] *[1]College of Textile and Clothing Engineering, Soochow University, Suzhou, China* *[2]National Engineering Laboratory for Modern Silk, Suzhou, China*
9:30	Effect of cotton and synthetic sleepwear on transient sleeping microenvironments Olga Troynikov, Christopher Watson, Nazia Nawaz *School of Fashion and Textiles, RMIT University, Brunswick, Victoria, Australia*

9:45 - 10:15	**Coffee break**

10:15-12:00	***Session 6*** **– Comprehensive models** Chairs: George Havenith and Ankit Joshi
10:15	Keynote speech: Multi-scale modelling of human and environment interaction @ Empa Part 1: A three scale approach for assessing the thermal comfort in urban environments Jonas Allegrini[1,2], Ajtac Kubilay[1,2], Jan Carmeliet[1,2] and Dominique Derome[1] *[1]Multiscale studies in building physics, Empa, Swiss Federal Laboratories for Material Science and Technology, Dübendorf, Switzerland* *[2]Chair of Building Physics , ETHZ, Zürich, Switzerland* Part 2: Interaction between human body, human thermal perception and clothing: a comprehensive model approach based on models developed and validated at Empa Agnes Psikuta[1], Ankit Joshi[1,2], Emel Mert[1], Barbara Koelblen[1,3], Simon Annaheim[1], René M Rossi[1] *[1]Biomimetic Membranes and Textiles, Empa, Swiss Federal Laboratories for Material Science and Technology, St. Gallen, Switzerland* *[2]University of Higher Alsace, ENSISA, Laboratoire de Physique et Mécanique Textiles, Mulhouse, France* *[3]Warsaw University of Technology, Air-Conditioning and Heating Department, Warsaw, Poland*
11:15	Thermal simulation of human body-clothing-environment system Muhammad Awais, Sybille Krzywinski, Ellen Wendt *TU Dresden, Institute of Textile Machinery and High Performance Material Technology (ITM), Dresden, Germany*
11:30	Experimental validation of a multi-solver heat transfer simulation methodology including occupant thermo-physiology Julien Joris[1], Sidali Mokdad[1], Roch El Khoury[1], Gabriel Crehan[2] *[1] Institut VEDECOM, Versailles, France* *[2]Groupe PSA- Centre Technique de Vélizy A, Route de Gisy, Vélizy-Villacoublay, France*

11:45	Comprehensive model of human-clothing-environment system Agnes Psikuta[1], Ankit Joshi[1,2], Emel Mert[1], Barbara Koelblen[1,3], Milos Fojtlin[1,4], Jingxian Xu[1,5], Simon Annaheim[1], René M Rossi[1] *[1]Empa, Swiss Federal Laboratories for Material Science and Technology, St. Gallen, Switzerland* *[2]University of Higher Alsace, ENSISA, Laboratoire de Physique et Mécanique Textiles, Mulhouse, France* *[3]Warsaw University of Technology, Air-Conditioning and Heating Department, Warsaw, Poland* *[4]Brno University of Technology, Dpt. of Thermodynamics and Environmental Engin., Brno, Czech Republic* *[5]Donghua University, College of Fashion and Design, Shanghai, China*

12:00 - 13:30	**Lunch break**

13:30-15:00	***Session 7* - High heat exposures - modelling and measurements** Chairs: Olga Troynikov and Yehu Lu
13:30	Modelling for predicting the thermal protective and comfort performance of fabrics used in firefighters' clothing Sumit Mandal, Simon Annaheim, Jemma Greve, Martin Camenzind, René M. Rossi *Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland*
13:45	Design of female protective jacket: wearer-centric approach Olga Troynikov, Nazia Nawaz *School of Fashion and Textiles, RMIT University, Brunswick, Victoria, Australia.*
14:00	Evaluation of heat protection and thermal physiological comfort of protective clothing fabrics for firefighters Li-Chu Wang, Chun-Ku Yeh, Wen-Chieh Chen, Shih-Hui Wu, Ching-Yi Chen, and Gwo-Tsuen Jou *Taiwan Textile Research Institute, New Taipei City, Taiwan*
14:15	Thermo-physiology and thermal protection of clothed human body with continuous sweating under radiant heat: a sweating manikin study Manhao Guan[1, 2], Simon Annaheim[2], Jun Li[1, 3, 4], Agnes Psikuta[2], Martin Camenzind[2], Sumit Mandal[2], René Rossi[2] *[1]College of Fashion and Design, Donghua University, Shanghai, China* *[2]Empa, Swiss Federal Laboratories for Materials Science and Technology, St. Gallen, Switzerland* *[3]Key Laboratory of Clothing Design and Technology, Donghua University, Shanghai, China* *[4]Tongji University Shanghai Institute of Design and Innovation, Shanghai, China*
14:30	Predicting the thermal energy storage and energy discharge of thermal protective clothing Jiazhen He[1], Yehu Lu[1], Yan Chen[1], Jun Li[2] [1]College of Textile and Clothing Engineering, Soochow University, Suzhou, China [2]College of Fashion and Design, Donghua University, Shanghai, China
14:45	Regional and total insulation and evaporative resistance values of clothing for sugarcane harvesters and chemical sprayers in Latin America. Kalev Kuklane *The Thermal Environment Laboratory, Division of Ergonomics and Aerosol Technology, Department of Design Sciences, Faculty of Engineering, Lund University, Lund, Sweden*

15:00-16:00	**Closing and farewell coffee break**