

# 13<sup>th</sup> International Conference on Environmental Ergonomics BOSTON, MASSACHUSETTS, USA



## ICEE 2009

Organizers

John W. Castellani

Thomas L. Endrusick

Welcome Colleagues to the 13<sup>th</sup> International Conference on Environmental Ergonomics. It is a pleasure to welcome you to Boston, Massachusetts.

The conference is divided into 13 Sessions, each comprising oral and poster presentations. We have 4 Keynote presentations and one mini-symposium. The sessions are:

- Clothing
- NBC/1<sup>st</sup> Responders
- Indexes
- Cold
- Cooling Systems
- Fluids/Hydration
- Manikins
- Modeling
- Methods
- Thermal Control
- Physiology & Performance
- Hypoxia
- Cognition, Perception & Comfort

We would like to thank our partners and sponsors this year, the U.S. Army Research Institute of Environmental Medicine / U.S. Army Medical Research & Materiel Command, W.L. Gore and Associates, and Measurement Technology NorthWest. Their sponsorship has ensured a successful meeting. We would also like to thank our exhibitor, Humanikin. Many special thanks to the New England Chapter of the American College of Sports Medicine (Dino Costanzo & Donna Murphy) for all the administrative support that they have given. This conference would not have been possible without their hard work. Thank you also to the Session Chairpersons for all their hard work and dedication to ICEE.

We hope that you have a wonderful meeting and have a chance to see all that Boston has to offer.

John W. Castellani  
Thomas L. Endrusick



## **ICEE 2009 Organizing & Programming Committee**

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Thomas L. Endrusick  
Nancy L. O'Connell  
Sue Carol Endrusick  
Laurie Blanchard  
Miyo Yokota  
Catherine O'Brien  
Xiaojiang Xu  
Robert Hollins  
Stephen Cheung  
Emiel den Hartog  
Ralph Goldman  
George Havenith  
Ingvar Holmer  
Glen Kenny  
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Peter Tikuisis (Canada)  
Michael Tipton (UK)  
Yutaka Tochihara (Japan)  
Jeurgen Werner (Germany)  
Eugene Wissler (USA)

## **Keynote Speakers**

Eugene Wilusz

Emiel den Hartog

Roger Barker

Lacy Holowatz

## **Symposium Speakers**

Paul Webb

Ollie Jay

Glen Kenny

## **Session Chairpersons**

### **Clothing**

Ralph Goldman

### **NBC/1<sup>st</sup> Responders**

Yoram Epstein

Sirkka Rissanen

### **Indexes**

Sally Nunnally

Satoro Ueno

### **Cold**

Stephen Cheung

Ellen Glickman

### **Cooling Systems**

Martin Barwood

Chuansi Gao

### **Fluids/Hydration**

Sam Cheuvront

Igor Mejkavic

### **Manikins**

Tom Endrusick

Jin-tu Fan

### **Modeling**

Miyo Yokata

Eugene Wissler

### **Methods**

Ingvar Holmer

### **Thermal Control**

Narihiko Kondo

Matt White

### **Physiology & Performance**

Nigel Taylor

### **Hypoxia**

Maria Koskolu

### **Cognition, Perception & Comfort**

Michael Tipton

Hui Zhang

# Partnerships

## Platinum Conference Partners



NEW ENGLAND CHAPTER

## Sponsorships

### Bronze Conference Sponsor



# **Schedule at a Glance**

**RECEPTION is SUNDAY, AUGUST 2 from 7:00-8:30 PM @ BAR 10 (Westin Hotel)**

**BANQUET IS THURSDAY, AUGUST 6 @ 8:00 pm, Staffordshire Room, 3<sup>rd</sup> Floor**

MONDAY, AUGUST 3, 2009

Time	8:15	<b>Opening Remarks</b>	John Castellani
	8:30	<b>GENE WILUSZ - Intelligent Textiles for Chemical Biological Protective Clothing</b>	
		<b>CLOTHING</b>	
	9:00	George Havenith	Evaporative Cooling in Protective Clothing- Efficiency in Relation to Distance from the Skin
	9:15	Thomas Bernard	Apparent Total Evaporative Resistance and Clothing Adjustment Factors at Different Humidities and Metabolic Rates
	9:30	Thomas Bernard	Effects of Porosity on Critical WBGT and Apparent Evaporative Resistance
	9:45	Anne M.J. van den Heuvel	Can Undergarments be of Benefit when Working In Protective Clothing in Hot Environments?
BREAK POSTERS	10:00	Anne M.J. van den Heuvel	Physiological Impact of First-responder Chemical, Biological and Radiological Protective Ensembles.
		Pete Kerry	An Evaluation of the Thermal Protective Clothing Used by Six Australian Fire Brigades.
		Peter Bröde	Calculating UTCI Equivalent Temperature
		Bernhard Kampmann	Physiological Responses to Temperature and Humidity Compared with Predictions of PHS and WBGT
		Phil Gibson	Thermal Balance Implications of Water Repellant Treatments on Military Uniform Fabrics
		Li Liu	The Study of Subjective Pressure Sensation Evaluation of Foundation Garment
		Yu-Wei Lin	The Analysis of Comfort Properties of PTFE-Laminated and Hydrophilic PU-Laminated Clothing
		Lawrence E. Armstrong	Thermal, Cardiovascular, Performance, & Anthropomorphic Evaluation of the American Football Uniform
	10:45	Alison Fogarty	Influence of Undershirt Type on Physiological Responses While Exercising in the Heat
	11:00	Xiaoqun Dai	Effect of Clothing Ventilation on Thermal insulation and Vapor Resistance
	11:15	Faming Wang	Effects of Air Velocity and Clothing Combination on the Heating Efficiency of an EHV: A Pilot Study
	11:30	Jill M. Stapleton	The Influence of Different Mining Clothing Ensembles on Whole-Body Heat Balance
	11:45	Agnes Psikuta	The Novel Single-Sector Human Simulator to Study Clothing Effects on Physiological Response
LUNCH	12:00		
		<b>NBC/1st RESPONDERS</b>	
	1:00	<b>EMIEL DEN HARTOG - Ergonomics of Protection for the Military and First-Responders in Hazardous Environments</b>	

1:30	Roger Barker	Human Factors Performance of a Prototype Suit with Deployable CBRN Features
1:45	Sirkka Rissanen	Impact of NBC Protective Clothing On the Performance of Medical Tasks In Warm And Cool Environments
2:00	C. D. Thake	A Thermal Physiological Comparison Between Two Explosives Ordnance Disposal (EOD) Suits During Work Related Activities in Moderate and Hot Conditions
2:15	W. Jon Williams	Evaluation of the Heat Stress Imposed by a Prototype Firefighter Ensemble with Chemical / Biological Hazard Protection
2:30	Emiel den Hartog	Combined Protection and Ergonomics Testing of Chemical-Biological Protective Equipment.
2:45	Igor Mekjavic	Contribution of Individual Components of the Slovene Armed Forces Desert Ensemble to Overall Heat Strain
3:00		
BREAK		
POSTERS		
	<b>INDEXES</b>	
3:45	Tord Kjellström	Climate Change and Occupational Heat Stress
4:00	JuYoun Kwon	Evaluation of the PMV Thermal Comfort Index in Outdoor Weather Conditions
4:15	Satoru Ueno	Utility of Predicted Heat Strain to Limit Short-term Heat Stress Exposures
4:30	Satoro Ueno	Modifications to Predicted Heat Strain (PHS) (ISO7933)
4:45	B. W. Olesen	Thermal Comfort During Exposure to Drifting Operative Temperatures

## TUESDAY, AUGUST 4, 2009

Time		<b>COLD</b>
8:45	Takafumi Maeda	Relationship between Vascular Function and Vasoconstrictive Response to Cold
9:00	Hitoshi Wakabayashi	The Effect of Four Weeks of Repetitive Mild Cold Water Immersion on Thermoregulatory Responses During Immersion and CIVD Response
9:15	Petro Botonis	The Effect of Skin Surface Menthol Application on Rectal Temperature During Prolonged Immersion in Cool Water
9:30	David Bellar	Hormonal Response to Acute Cold Exposure and 53 Hours of Sleep Deprivation
9:45	Matthew D. Muller	Cognitive and Manual Performance Following Interval vs. Continuous Exercise in the Cold
10:00	Clare M Eglin	Classification of Non-Freezing Cold Injury in Patients: An Interim Report
BREAK POSTERS	Jonathan P. Stephens	Damage to Vascular Endothelium and Smooth Muscle Contribute to the Development of Non-freezing Cold Injury in the Rat Tail Vascular Bed In Vitro
	Joonhee Park	Effects of Wear Training on Blood Pressure and Pulse Transit Time
	Catherine O'Brien	Face Protection During Cold Air Exposure Limits Finger Cooling and Improves Thermal Comfort
	Martin Barwood	Tolerance for Intermittent Exercise in Military Clothing is Improved by Wearing a Ventilated Vest in Hot, Dry Conditions
	Amir Hadid	Effect of a Personal Ambient Ventilation System on Physiological Strain During Heat Stress Wearing Body-Armour
	Elizabeth A. McCullough	Evaluation of Personal Cooling Systems for Soldiers
	T. Erlich	Hydration Status Evaluation of Combat Soldiers During Marches
	Christiano Machado-Moreira	Sweating and Skin Blood Flow Changes During Progressive Dehydration.
	G.E. Peoples	Cardiac Electrophysiology During Progressive and Controlled Dehydration: Inferences from ECG Analysis During Steady-State Exercise and Recovery.
	Jim House	Reducing Heat Strain Using Phase-Change Cooling Vests with Different Melting Temperatures
10:45	Avelino Virgilio Fernandes Monteiro de Oliveira	Assessment of Cold Stress: Field Measurements and Subjective Analysis
11:00	Karl Peter Ittner	An Infrared View of the Convective Warming Devices Bair Hugger 750 and WarmTouch
11:15	Mariann Sandsund	Thermoregulatory Responses In Cross-Country Skiers - A Field Study
11:30	Jonathan T. Power	Human Thermal Responses in Wind and Waves
11:45		
12:00	LUNCH	

### **COOLING SYSTEMS**

- 1:00 Joanne N. Caldwell Immersion Cooling During Hyperthermia: Why Warmer May Be Better.
- 1:15 Martin J. Barwood Post-exercise Cooling Techniques in Hot, Humid Conditions
- 1:30 Samuel Cheuvront Optimization of Liquid Microclimate Cooling Systems: Importance of Skin Temperature
- 1:45 Amir Hadid NBC Suit Ventilation Alleviates the Physiological Strain
- 2:00 Jill M. Stapleton The Effect of Wearing a Cooling Vest to Alleviate Thermal Strain During Moderate Intensity Work
- 2:15 Chuansi Gao Effects of Temperature Gradient on Cooling Effectiveness of PCM Vests in an Extremely Hot Climate
- 2:30 Aitor Coca Evaluation of Five Cooling Conditions wearing a Prototype Firefighter Ensemble
- 2:45 Nina Kocjan Influence of Pre-Cooling Intensity On Vasomotor Response and Metabolic Heat Production

3:00

BREAK  
POSTERS

### **FLUIDS/HYDRATION**

- 3:45 Andrew Hunt Dehydration is a Health and Safety Concern for Surface Mine Workers.
- 4:00 Nigel Taylor The Efficacy of Saliva Osmolality as an Index of Hydration State: Is It Worth the Spit?
- 4:15 Hannu Rintamaki Hydration by Water or Saccharose Drinks During Exercise on Cold: Effects on Leukocyte Counts
- 4:30 Nigel Taylor Revisiting Indices of Hydration State During Progressive Dehydration to a 7% Water Deficit.

## WEDNESDAY, AUGUST 5, 2009

Time

		<b>The Role of Instrumented Manikins in the Development of Advanced Protective Clothing Systems</b>
	<b>ROGER BARKER</b>	
8:30		
	<b>MANIKINS</b>	
9:00	Peter Bröde	A Thermal Manikin Study on the Heat Gain from Infrared Radiation with Wet Clothing
9:15	John P. Rugh	Assessment of Hypothermia Blankets Using an Advanced Thermal Manikin
9:30	Janet L. Brady	Comparison of Thermal Resistance Between Two Garment Designs Driven by Material Characteristics Using a Thermal Heated Manikin
9:45	Adélio M. Rodrigues Gaspar	Thermal Insulation Measurements with a Movable Thermal Manikin
10:00	Yuen Shing Wu	Testing Sleeping Bags Using a Supine Sweating Fabric Manikin
10:15	Richard Burke	Integrating an Active Physiological and Comfort Model to the Newton Sweating Thermal Manikin
10:30	Takako Fukazawa	Convective Heat Transfer Coefficient from Baby is Smaller than that from Adult
BREAK	Elizabeth McCormack	The Prediction of Survival Time in Water
POSTERS	Thomas Endrusick	Thermal Manikin Evaluation for a Chemical Protective Enclosure for Battlefield-Injured Soldiers
	Heather Lunt	Reliability of Non-Invasive Measures of Autonomic Modulation in Different Postures and Exercise Intensities
	Xiaojiang Xu	Determination of Footwear Area Factors
	Irena Yermakova	Information Technology for Prediction of Human State During Exercise
	Larry Berglund	Portable Protective Dog Enclosure and its Thermal Effects on the Animal
	Tomonori Sakoi	Identification of Heat and Vapor Transfer Coefficients, Equivalent Air Temperatures, and Vapor Pressures for Local Body Segments in Nonuniform Thermal Environments
	<b>MODELS</b>	
11:00	Eugene H. Wissler	A New Human Thermal Model
11:15	Shintaro Yokoyama	Mathematical Model of Thermal Reception and Integration and its Combination with Prediction System of Whole Body Temperatures
11:30	Xiaojiang Xu	Predicting Survival Time During Air Exposure and Water Immersion

11:45 A. Christian Turner Recommendations for the U.S. Coast Guard Survival Prediction Tool

12:00 Miyo Yokota Effects of Physical Characteristics on Predicted Heat Casualty Rate

12:15 LUNCH

1:15 Jochim Koch Validation of a Simulation Program for the Thermoregulation of Patients and Fire Fighters

**METHODS**

1:30 Michel B. DuCharme A Calorimetric Validation of Evaporative and Dry Heat Losses Measured with Heat Flow Transducers

1:45 Hanns-Christian Gunga The Double Sensor - A Non-Invasive Device to Continuously Monitor Core Temperature In Humans On Earth And In Space

2:00 Jochim Koch Validation of a Non Invasive Core Temperature Sensor for Neonates; Adult Patients and Fire Fighters

POSTERS

**TOURS TO HARVARD, INSTITUTE OF NANOTECHNOLOGY & FREEDOM TRAIL. SEE SIGN-UP SHEETS AT USARIEM EXHIBIT.**

THURSDAY, AUGUST 6, 2009

Time

8:30		<b>LACY HOLOWATZ - Low-dose Aspirin and Clopidogrel Attenuate Reflex Cutaneous Vasodilation in Middle Aged Skin</b>
9:00	D. Jason Gillis	<b>THERMAL CONTROL</b> The Effect of L-Menthol on Thermoregulation and Sensation During Exercise in Warm and Humid Conditions
9:15	Nigel Taylor	The Roles of Hands and Feet in Temperature Regulation in Hot and Cold Environments.
9:30	Jill M. Stapleton	Exercise Training Does Not Influence Whole Body Heat Storage During Exercise in Previously Sedentary Individuals
9:45	Kazuyo Tsuzuki	Thermoregulation During Sleep in Elderly and Young People
10:00	Yoram Epstein Brian Farnworth Joonhee Park Akira Kato Robert Kenefick Glen P. Kenny Myung-Ju Kim Hyungkook Lee Heather Lunt Denise L. Smith Jay H. Heaney Kazuyo Tsuzuki Yehu Lu	The Sympatho-vagal Regulation of Heart Rhythm During Acclimation to Heat: Analyzing Heartrate Variability by Means of the Multipole Method Does the Rate of Thermoregulatory Sweating Depend on the Rate of Change of Core Temperature? Relationship Between Hemodynamic and Thermoregulatory Responses during Thermal Stimulation using Ambient Temperature The Effect of Floor Heating System on Physiological and Psychological Responses in Sitting Posture with Throwing Legs Prior Heat Stress: Effect on Subsequent 15-minute Time Trial Performance in the Heat Heat Stress in Canadian Deep Mechanized Mines: Laboratory Simulation of Typical Mining Tasks Performed in Varying Environments Effect of Hair Style on Human Physiological Responses in a Hot Environment Comparison of Physiological Variables and Body Composition Variables Among Walking Types on Treadmill Changes in Recumbent Cycling Cadence Influence Heart Rate Variability Effects of Short Bouts of Firefighting Activity on Platelet Number and Aggregability Use of a Heat Tolerance Test to Evaluate Return to Duty Status in US Navy and Marine Corps Personnel Effects of Seasonal, Thermal, and Lighting Environment on Sleep in the Elderly Living in the Detached Houses Wavelet-Based Analysis of Skin Blood Flow at Lower Limb Under External Pressure
BREAK POSTERS		
10:45	Christiano Machado-Moreira	Sweat Gland Recruitment Following Thermal and Psychological Stimuli.
11:00	Caroline Smith	Body Mapping of Sweating in Male Athletes
11:15	Titis Wijayanto	Physiological Responses During 60min Leg Immersion in Japanese and Malaysian Males
11:30	Yoshimitsu Inoue	Sweat Gland Function in Thai and Japanese Males in Relation to Physical Training
11:45	Joo-Young Lee	Peripheral Thermal Thresholds and Thermoeffectors Threshold Zone in Malaysian and Japanese Males

12:00 LUNCH

1:00 **SYMPOSIUM - Body Heat Storage and Work in the Heat: A Calorimetric Perspective**

**Paul Webb - Direct Calorimetry & Thermoregulation**

**Ollie Jay - An Improved Method for Estimating the Rate of Body Heat Storage using Thermometry**

**Glen Kenny - Thermal and Non-thermal Influences on Whole-Body Heat Exchange and Heat Balance during heat Stress**

**PHYSIOLOGY & PERFORMANCE**

2:00 Matthew D. White A Comparison of Thermal Hyperpnea Responses Between Younger and Older Males During Hyperthermia

2:15 Michael J. Tipton ECG and Heart Rate During Helicopter Underwater Escape Training (HUET) of Novice Trainees

2:30 Dani Moran Heat Intolerance Assessment of 367 Post Heat Stroke Cases

2:45 C. D. Thake The Effect of Heat Acclimation on Thermal Strain During Explosives Ordnance Disposal (EOD) Related Activity in Moderate and Hot Conditions

3:00 Yael Arbel Lifestyle Before Recruitment and Stress Fracture Occurrence During 12-months of Strenuous Training

3:15 BREAK  
POSTERS

3:45 R. Yanovich Hematological Profile of Female Soldiers Under Different Tasks and Environmental Conditions

**HYPOXIA**

4:00 Heather Lunt Reliability Of Measures Of Autonomic Activity During Acute Hypoxic Exposures

4:15 Miriam E. Clegg Responses to Isocapnic Hypoxia in a Hot Work Environment Differ in Younger and Older Males

4:30 Yuval Heled Physiological and Psychomotor Performances in Hypoxic Conditions After Heat Acclimation

4:45 T. Meeuwssen Reduced Cold-induced Vasodilation at Altitude: Due to Hypoxic or Hypobaric Circumstances?

## FRIDAY, AUGUST 7, 2009

Time	COGNITION/PERCEPTION/COMFORT		
8:30	Mark Newton	The Sensitivity of Initial Thermal Perceptions When Altering Local Skin Temperatures by Modifying Microclimate Relative Humidity	
8:45	Cornelis P. Bogerd	Parameterization of Temperature Perception of Ventilation Changes in Full-face Motorcycle Helmets	
9:00	Cornelis P. Bogerd	The Effects of Wearing a Full-face Motorcycle Helmet on Cognitive Performance in a Warm Environment	
9:15	Lee Ju-Youn	Physiological and Psychological Effect of the New Control Algorithm Adapted to Thermal Sensibility	
9:30	John Gunstad	Effects of Acute Cold Exposure on Cognitive Function:	
9:45	Gary Kamimori	Combined Effects of Cold Exposure and 53 Hours of Sleep Deprivation on a Sustained Attention Task	
10:00	BREAK POSTERS	Sarah Davey Hikaru Enomoto D. Jason Gillis Lisa Kelly Lisa Kelly	
		Can Brain Activity be used as an Objective Measure of Thermal Perception? Effects of Lower Body Warming on Physiological and Psychological Responses of Humans The Effect of Two Cycling Helmets on Thermoregulation and Thermal Perception During Exercise in Warm and Humid Conditions A Comparison of Data Collection Methods for Measuring Thermal Comfort on Train Journeys Thermal Comfort when Boarding Trains – Preliminary Data	
10:45	Sarah L. Davey	The Influence of the Rate of Torso Skin Temperature Change on Thermal Perceptions Whilst Exercising in the Heat	
11:00	Simon Hodder	Initial Thermal Sensation Responses to Simulated Solar Radiation	
11:15	Tyler Hoyt	Energy Savings from Extended Air Temperature Setpoints and Reductions in Room Air Mixing	
11:30	C.D. Thake	Physiological, Perceptual and Cognitive Responses to Conducting Nuclear Decommissioning Related Activities When Wearing a Pressurized Conditions	

## **DAY 1: MONDAY, AUGUST 3, 2009**

8:15

### **Opening Remarks**

John Castellani

### **CLOTHING**

**Session Chair: Ralph Goldman**

### **KEYNOTE**

8:30

#### **INTELLIGENT TEXTILES FOR CHEMICAL BIOLOGICAL PROTECTIVE CLOTHING**

Eugene Wilusz

Natick Soldier Research, Development & Engineering Command

9:00

#### **EVAPORATIVE COOLING IN PROTECTIVE CLOTHING-EFFICIENCY IN RELATION TO DISTANCE FROM SKIN**

*George Havenith, Peter Bröde, Victor Candas, Emiel den Hartog, Ingvar Holmér, Kalev Kuklane, Harriet Meinander, Wolfgang Nocker, Mark Richards, and Xiaoxin Wang*

9:15

#### **APPARENT TOTAL EVAPORATIVE RESISTANCE AND CLOTHING ADJUSTMENT FACTORS AT DIFFERENT HUMIDITIES AND METABOLIC RATES**

*Thomas E. Bernard, Victor Caravello, Elizabeth A. McCullough, and Candi D. Ashley*

9:30

#### **EFFECTS OF POROSITY ON CRITICAL WBGT AND APPARENT EVAPORATIVE RESISTANCE**

*Thomas Bernard, Candi Ashley, Joseph Trentacosta, Vivek Kapur, and Stephanie Tew*

9:45

#### **CAN UNDERGARMENTS BE OF BENEFIT WHEN WORKING IN PROTECTIVE CLOTHING IN HOT ENVIRONMENTS?**

*Anne M.J. van den Heuvel, Pete Kerry, Jeroen van der Velde, Mark J. Patterson and Nigel A.S. Taylor*

**SUPPORTED BY GORE**

10:00

### **Break & Poster Session**

PHYSIOLOGICAL IMPACT OF FIRST-RESPONDER CHEMICAL, BIOLOGICAL AND RADIOLOGICAL PROTECTIVE ENSEMBLES

*Anne M.J. van den Heuvel, Joanne N. Caldwell, Mark J. Patterson, and Nigel A.S. Taylor*

POSTER BOARD #1

**SUPPORTED BY GORE**

AN EVALUATION OF THE THERMAL PROTECTIVE CLOTHING USED BY SIX AUSTRALIAN FIRE BRIGADES

*Pete Kerry, Anne M.J. van den Heuvel, Martin van Dijk, Gregory E. Peoples, and Nigel A.S. Taylor*

POSTER BOARD #2

CALCULATING UTCI EQUIVALENT TEMPERATURE

*Peter Bröde, Dusan Fiala, Krzysztof Blazejczyk, Yoram Epstein, Ingvar Holmér, Gerd Jendritzky, Bernhard Kampmann, Mark Richards, Hannu Rintamäki, Avraham Shitzer, and George Havenith*

POSTER BOARD #3

PHYSIOLOGICAL RESPONSES TO TEMPERATURE AND HUMIDITY COMPARED WITH PREDICTIONS OF PHS AND WBGT

*Bernhard Kampmann and Peter Bröde*

POSTER BOARD #4

THERMAL BALANCE IMPLICATIONS OF WATER REPELLENT TREATMENTS ON MILITARY UNIFORM FABRICS

*Phil Gibson*

POSTER BOARD #5

THE STUDY OF SUBJECTIVE PRESSURE SENSATION EVALUATION OF FOUNDATION GARMENT

*Li Liu and Wei-Yuan Zhang*

POSTER BOARD #6

THE ANALYSIS OF COMFORT PROPERTIES OF PTFE-LAMINATED AND HYDROPHILIC PU-LAMINATED CLOTHING

*Yu-Wei Lin, Li-Chu Wang, Gwo-Tsuen Jou and Markus Weder*

POSTER BOARD #7

THERMAL, CARDIOVASCULAR, PERFORMANCE, & ANTHROPOMORPHIC EVALUATION OF THE AMERICAN FOOTBALL UNIFORM

*Lawrence E. Armstrong, Evan C. Johnson, Douglas J. Casa, Matthew S. Ganio, Brendon McDermott, Linda Yamamoto, Rebecca M. Lopez, and Holly Emmanuel*

POSTER BOARD #8

## **CLOTHING**

10:45

INFLUENCE OF UNDERSHIRT TYPE ON PHYSIOLOGICAL RESPONSES WHILE EXERCISING IN THE HEAT

*Alison L. Fogarty, Wade H. Sinclair, Stephan Rudzki, and Mark J. Patterson*

11:00

EFFECT OF CLOTHING VENTILATION ON THERMAL INSULATION AND VAPOR RESISTANCE

*Xiaoqun Dai and George Havenith*

**SUPPORTED BY GORE**

11:15

EFFECTS OF AIR VELOCITY AND CLOTHING COMBINATION ON HEATING EFFICIENCY OF AN ELECTRICALLY HEATED VEST (EHV): A PILOT STUDY

*Faming Wang, Chuansi Gao, and Ingvar Holmér*

**SUPPORTED BY GORE**

11:30

THE INFLUENCE OF DIFFERENT MINING CLOTHING ENSEMBLES ON WHOLE-BODY HEAT BALANCE

*Jill Stapleton, Stephen G. Hardcastle, Cheryl Allen and Glen P. Kenny*

**SUPPORTED BY GORE**

11:45

THE NOVEL SINGLE-SECTOR HUMAN SIMULATOR TO STUDY CLOTHING EFFECTS ON PHYSIOLOGICAL RESPONSE

*Agnes Psikuta and René Rossi*

12:00

**LUNCH**

## **NBC/1<sup>st</sup> RESPONDERS**

**Session Chairs: Yoram Epstein & Sirkka Rissanen**

### **KEYNOTE**

1:00

ERGONOMICS OF PROTECTION FOR THE MILITARY AND FIRST RESPONDERS IN HAZARDOUS ENVIRONMENTS

Emiel den Hartog

TNO Defence, Security and Safety

1:30

HUMAN FACTORS PERFORMANCE OF A PROTOTYPE FIREFIGHTER SUIT WITH DEPLOYABLE CBRN FEATURES

*Barker, R.L., Deaton, A.S., and Liston, G.C.*

1:45

IMPACT OF NBC PROTECTIVE CLOTHING ON THE PERFORMANCE OF MEDICAL TASKS IN WARM AND COOL ENVIRONMENTS

*Sirkka Rissanen, Irma Jousela and Hannu Rintamäki*

2:00

A THERMAL PHYSIOLOGICAL COMPARISON BETWEEN TWO EXPLOSIVES ORDNANCE DISPOSAL (EOD) SUITS DURING WORK RELATED ACTIVITIES IN MODERATE AND HOT CONDITIONS.

*C. D. Thake, M. J. Zurawlew, M. J. Price and M. Oldroyd*

2:15

EVALUATION OF THE HEAT STRESS IMPOSED BY A PROTOTYPE FIREFIGHTER ENSEMBLE WITH CHEMICAL/BIOLOGICAL HAZARD PROTECTION

*W. Jon Williams, Aitor Coca, Raymond Roberge, Jeffery Powell, Angie Shepherd, and Ronald Shaffer*

2:30

COMBINED PROTECTION AND ERGONOMICS TESTING OF CHEMICAL-BIOLOGICAL PROTECTIVE EQUIPMENT

*Emiel A Den Hartog, Richard Van Eenennaam, and Menno De Jonge*

2:45

CONTRIBUTION OF INDIVIDUAL COMPONENTS OF THE SLOVENE ARMED FORCES DESERT ENSEMBLE TO OVERALL HEAT STRAIN

*Igor B. Mekjavic, Bostjan Simunic, Daniela Zavec Pavlinic, Ola Eiken, and Victor Candas*

3:00

**Break & Poster Session**

## **INDEXES**

**Session Chairs: Sally Nunneley & Satoru Ueno**

3:45

CLIMATE CHANGE AND OCCUPATIONAL HEAT STRESS

*Tord Kjellström, Bruno Lemke, and Ingvar Holmér*

4:00

EVALUATION OF THE PMV THERMAL COMFORT INDEX IN  
OUTDOOR WEATHER CONDITIONS

*JuYoun Kwon and Ken Parsons*

**SUPPORTED BY GORE**

4:15

UTILITY OF PREDICTED HEAT STRAIN TO LIMIT SHORT-TERM HEAT STRESS  
EXPOSURES

*Satoru Ueno, Ronald Long, Skai W. Schwartz, Candi D. Ashley, Shin-ichi Sawada,  
Thomas E. Bernard*

4:30

MODIFICATIONS TO PREDICTED HEAT STRAIN (PHS) (ISO7933)

*Satoru Ueno, Shin-ichi Sawada, Thomas E. Bernard*

4:45

THERMAL COMFORT DURING EXPOSURE TO DRIFTING OPERATIVE  
TEMPERATURES

*B. W. Olesen, J. Toftum and J. Kolarik*

## **DAY 2: TUESDAY, AUGUST 4, 2009**

### **COLD**

**Session Chairs: Stephen Cheung & Ellen Glickman**

8:45

RELATIONSHIP BETWEEN VASCULAR FUNCTION AND VASOCONSTRICTIVE RESPONSE TO COLD

*Takafumi Maeda, Tetsuhito Fukushim, Masashi Kuramae, and Shintaro Yokoyama*

9:00

EFFECT OF FOUR WEEKS REPETITIVE MILD COLD WATER IMMERSION ON THERMOREGULATORY RESPONSES DURING IMMERSION AND CIVD RESPONSE

*Hitoshi Wakabayashi, Hideto Kuroki, Titis Wijayanto, Joo-Young Lee, and Yutaka Tochihara*

9:15

THE EFFECT OF SKIN SURFACE MENTHOL APPLICATION ON RECTAL TEMPERATURE DURING PROLONGED IMMERSION IN COOL WATER

*Petros Botonis, Stelios Kounalakis, Evgenia Cherouveim, Maria Koskolou, and Nickos Geladas*

**SUPPORTED BY GORE**

9:30

HORMONAL RESPONSE TO ACUTE COLD EXPOSURE AND 53 HOURS OF SLEEP DEPRIVATION

*David M. Bellar, Ellen L. Glickman, Katie Pierce, Matthew Muller, John Gunstad*

**SUPPORTED BY GORE**

9:45

COGNITIVE AND MANUAL PERFORMANCE FOLLOWING INTERVAL VS CONTINUOUS EXERCISE IN THE COLD

*Matthew D. Muller, Ellen L. Glickman, Edward J. Ryan, Chul-Ho Kim, Megan L. Williamson, Emily J. Fickes, Sarah M. Muller, and John Gunstad*

10:00

**Break & Poster Session**

CLASSIFICATION OF NON-FREEZING COLD INJURY IN PATIENTS: AN INTERIM REPORT

*Clare M. Eglin, Frank St.C. Golden and Michael J. Tipton*

POSTER BOARD #1

DAMAGE TO VASCULAR ENDOTHELIUM AND SMOOTH MUSCLE CONTRIBUTE TO THE DEVELOPMENT OF NON-FREEZING COLD INJURY IN THE RAT TAIL VASCULAR BED *IN VITRO*

*Jonathan P. Stephens, David W. Laight, Frank St.C. Golden & Michael J. Tipton*  
POSTER BOARD #2

EFFECTS OF WEAR TRAINING ON BLOOD PRESSURE AND PULSE TRANSIT TIME

*Joonhee Park, Choi Jeongwha, and Son Ilna*  
POSTER BOARD #3

**SUPPORTED BY GORE**

FACE PROTECTION DURING COLD AIR EXPOSURE LIMITS FINGER COOLING AND IMPROVES THERMAL COMFORT

*Catherine O'Brien and Ingrid V. Sils*  
POSTER BOARD #4

TOLERANCE FOR INTERMITTENT EXERCISE IN MILITARY CLOTHING IS IMPROVED BY WEARING A VENTILATED VEST IN HOT, DRY CONDITIONS

*Martin J. Barwood, Phillip S. Newton, and Michael J. Tipton*  
POSTER BOARD #5

EFFECT OF A PERSONAL AMBIENT VENTILATION SYSTEM ON PHYSIOLOGICAL STRAIN DURING HEAT STRESS WEARING BODY-ARMOUR

*A. Hadid, Y. Fuks, T. Erlich, R. Yanovich, Y. Heled, N. Azriel, D.S. Moran*  
POSTER BOARD #6

**SUPPORTED BY GORE**

EVALUATION OF PERSONAL COOLING SYSTEMS FOR SOLDIERS

*Elizabeth A. McCullough and Steve Eckels*  
POSTER BOARD #7

HYDRATION STATUS EVALUATION OF COMBAT SOLDIERS DURING MARCHES

*Erlich T., Sawka M., Hadid A., Ben-Ari O., Arbel Y., Heled Y., Yanovich Y., Chevront S., Shapiro Y., Moran DS.*

POSTER BOARD #8

SWEATING AND SKIN BLOOD FLOW CHANGES DURING PROGRESSIVE DEHYDRATION.

*Christiano A. Machado-Moreira, Joanne N. Caldwell, Anne M.J. van den Heuvel, Pete Kerry, Gregory E. Peoples, and Nigel A.S. Taylor*

POSTER BOARD #9

**SUPPORTED BY GORE**

CARDIAC ELECTROPHYSIOLOGY DURING PROGRESSIVE AND CONTROLLED DEHYDRATION: INFERENCES FROM ECG ANALYSIS DURING STEADY-STATE EXERCISE AND RECOVERY

*Gregory E. Peoples, Marc A. Brown, Anne M.J. van den Heuvel, Pete Kerry, and Nigel A.S. Taylor*

POSTER BOARD #10

REDUCING HEAT STRAIN USING PHASE-CHANGE COOLING VESTS WITH DIFFERENT MELTING TEMPERATURES

*Jim House, Heather Lunt, Rowan Taylor, Carol House, Jason Lyons and Gemma Milligan*

POSTER BOARD #11

**COLD**

10:45

ASSESSMENT OF COLD STRESS: FIELD MEASUREMENTS AND SUBJECTIVE ANALYSIS

*A. Virgílio M. Oliveira, Adélio R. Gaspar, and Divo A. Quintela*

11:00

AN INFRARED-VIEW OF THE CONVECTIVE-WARMING DEVICES BAIR HUGGER 750 AND WARMTOUCH

*Karl Peter Ittner, Julia Küffner, Markus Werkmann and Michael Pawlik*

11:15

THERMOREGULATORY RESPONSES IN CROSS-COUNTRY SKIERS: A FIELD STUDY

*Mariann Sandsund, Øystein Wiggen, Hilde Færevik, Lars Karlöf, and Randi E. Reinertsen*

11:30

HUMAN THERMAL RESPONSES IN WIND AND WAVES

*Jonathan T. Power, Antonio J. Simões Ré, and Michael J. Tipton*

12:00

**Lunch**

## **COOLING SYSTEMS**

**Session Chairs: Martin Barwood & Chaunsi Gao**

1:00

IMMERSION COOLING DURING HYPERTHERMIA: WHY WARMER MAY BE BETTER.

*Joanne N. Caldwell, Anne M.J. van den Heuvel, Pete Kerry, Mitchell J. Clark, Gregory E. Peoples and Nigel A.S. Taylor*

**SUPPORTED BY GORE**

1:15

POST-EXERCISE COOLING TECHNIQUES IN HOT, HUMID CONDITIONS

*Martin J. Barwood, Sarah Davey, James R. House and Michael J. Tipton*

1:30

OPTIMIZATION OF LIQUID MICROCLIMATE COOLING SYSTEMS: IMPORTANCE OF SKIN TEMPERATURE

*Samuel N. Cheuvront, Scott J. Montain, Lou A. Stephenson, and Michael N. Sawka*

1:45

NBC SUIT VENTILATION ALLEVIATES THE PHYSIOLOGICAL STRAIN

*A. Hadid, Y. Fuks, T. Erlich, R. Yanovich, Y. Heled, N. Azriel, D.S. Moran*

**SUPPORTED BY GORE**

2:00

THE EFFECT OF WEARING A COOLING VEST TO ALLEVIATE THERMAL STRAIN DURING MODERATE INTENSITY WORK

*Jill M. Stapleton, Christopher Q. Lan, Stephen G. Hardcastle and Glen P. Kenny*

**SUPPORTED BY GORE**

2:15

EFFECTS OF TEMPERATURE GRADIENT ON COOLING EFFECTIVENESS OF PCM VESTS IN AN EXTREMELY HOT CLIMATE

*Chuansi Gao, Kalev Kuklane, and Ingvar Holmér*

2:30

EVALUATION OF FIVE COOLING CONDITIONS WEARING A PROTOTYPE FIREFIGHTER ENSEMBLE

*Aitor Coca, Raymond Roberge, Jeffrey Powell, Andrew Palmeiro, and W. Jon Williams*

2:45

INFLUENCE OF PRE-COOLING INTENSITY ON VASOMOTOR RESPONSE AND METABOLIC HEAT PRODUCTION

*Kocjan, N., Perret, C., Bogerd, CP., Rossi, MR., and Daanen, HAM*

**SUPPORTED BY GORE**

3:00

**Break & Poster Session**

**FLUIDS & HYDRATION**

**Session Chairs: Sam Cheuvront & Igor Mekjavic**

3:45

DEHYDRATION IS A HEALTH AND SAFETY CONCERN FOR SURFACE MINE WORKERS.

*Andrew Hunt, Ian Stewart, and Tony Parker*

**SUPPORTED BY GORE**

4:00

THE EFFICACY OF SALIVA OSMOLALITY AS AN INDEX OF HYDRATION STATE: IS IT WORTH THE SPIT?

*Nigel A.S. Taylor, Anne M.J. van den Heuvel, Pete Kerry, Sheena McGhee, Christiano A. Machado-Moreira, Marc A. Brown, Mark J. Patterson and Gregory E. Peoples*

4:15

HYDRATION BY WATER OR SACCHAROSE DRINKS DURING EXERCISE ON COLD: EFFECTS ON LEUKOCYTE COUNTS

*Hannu Rintamäki, Tero Mäkinen and Heljä-Marja Surcel*

4:30

REVISITING INDICES OF HYDRATION STATE DURING PROGRESSIVE DEHYDRATION TO A 7% WATER DEFICIT

*Nigel A.S. Taylor, Anne M.J. van den Heuvel, Pete Kerry, Sheena McGhee, Christiano A. Machado-Moreira, Marc A. Brown, and Gregory E. Peoples*

## **DAY 3: WEDNESDAY, AUGUST 5, 2009**

### **MANIKINS**

**Session Chairs: Thomas Endrusick and Jin-tu Fan**

8:30

#### **KEYNOTE**

Roger Barker

The Role of Instrumented Manikins in the Development of Advanced Protective Clothing Systems

North Carolina State University

9:00

A THERMAL MANIKIN STUDY ON THE HEAT GAIN FROM INFRARED RADIATION WITH WET CLOTHING

*Peter Bröde, Kalev Kuklane, and George Havenith*

9:15

ASSESSMENT OF HYPOTHERMIA BLANKETS USING AN ADVANCED THERMAL MANIKIN

*John P. Rugh and Khalid Barazanji*

9:30

COMPARISON OF THERMAL RESISTANCE BETWEEN TWO GARMENT DESIGNS DRIVEN BY MATERIAL CHARACTERISTICS USING A THERMAL HEATED MANIKIN

*Janet L. Brady, Niny Z. Rao, Timothy Rioux, and Carole Winterhalter*

9:45

THERMAL INSULATION MEASUREMENTS WITH A MOVABLE THERMAL MANIKIN

*Adélio R. Gaspar, A. Virgílio M. Oliveira, and Divo A. Quintela*

10:00

TESTING SLEEPING BAGS USING A SUPINE SWEATING FABRIC MANIKIN

*Yuen Shing Wu and Jintu Fan*

10:15

INTEGRATING AN ACTIVE PHYSIOLOGICAL AND COMFORT MODEL TO THE NEWTON SWEATING THERMAL MANIKIN

*Richard Burke, Dr. Allen Curran, and Mark Hepokoski*

10:30

**Break & Poster Session**

CONVECTIVE HEAT TRANSFER COEFFICIENT FROM BABY IS  
SMALLER THAN THAT FROM ADULT

*Takako Fukazawa, Tomoko Ando, Sachiyo Ikeda, Ayu Yamaguchi,  
Ingvar Holmér, and Yutaka Tochihara*

POSTER BOARD #1

THE PREDICTION OF SURVIVAL TIME IN WATER

*Elizabeth McCormack, Chris A. Turner, and Michael J. Tipton*

POSTER BOARD #2

THERMAL MANIKIN EVALUATION OF A CHEMICAL PROTECTIVE ENCLOSURE  
FOR BATTLEFIELD-INJURED SOLDIERS

*Thomas Endrusick, Julio Gonzalez, Miyo Yokota, and Donald MacLeod*

POSTER BOARD #3

RELIABILITY OF NON-INVASIVE MEASURES OF AUTONOMIC MODULATION IN  
DIFFERENT POSTURES AND EXERCISE INTENSITIES

*Heather Lunt, Martin J. Barwood, Jo Corbett, and Michael J. Tipton*

POSTER BOARD #4

**SUPPORTED BY GORE**

DETERMINATION OF FOOTWEAR AREA FACTORS

*Xiaojiang Xu, Laurie Blanchard, and Thomas Endrusick*

POSTER BOARD #5

INFORMATION TECHNOLOGY FOR PREDICTION OF HUMAN STATE DURING  
EXERCISE

*I. Yermakova, K. Dukchnovskaya, N. Ivanushkina, and N. Nikolaienko*

POSTER BOARD #6

PORTABLE PROTECTIVE DOG ENCLOSURE AND ITS THERMAL EFFECTS ON  
THE ANIMAL

*Larry Berglund, Thomas Endrusick, Miyo Yokota, and William Santee*

POSTER BOARD #7

IDENTIFICATION OF HEAT AND VAPOR TRANSFER COEFFICIENTS, EQUIVALENT  
AIR TEMPERATURES, AND VAPOR PRESSURES FOR LOCAL BODY SEGMENTS  
IN NONUNIFORM THERMAL ENVIRONMENTS

*Tomonori Sakoi, Shinsuke Kato, Ryoza Ooka, Hideaki Nagano, Shengwei Zhu, and  
Toshiaki Omori*

POSTER BOARD #8

## **MODELS**

**Session Chairs: Eugene Wissler & Miyo Yokota**

11:00

A NEW HUMAN THERMAL MODEL

*Eugene H. Wissler*

11:15

MATHEMATICAL MODEL OF THERMAL RECEPTION AND INTEGRATION AND ITS COMBINATION WITH PREDICTION SYSTEM OF WHOLE BODY TEMPERATURES

*Shintaro Yokoyama, Takuya Yusa, Dai Shibayam, Akira Kato, Takafumi Maeda, and Masashi Kuramae*

11:30

PREDICTING SURVIVAL TIME DURING AIR EXPOSURE AND WATER IMMERSION

*Xiaojiang Xu, Mitesh Amin, William R. Santee, Miyo Yokota, and Chris Turner*

11:45

RECOMMENDATIONS OF THE U.S. COAST GUARD SURVIVAL PREDICTION TOOL

*A. Christian Turner, Arthur A. Allen, and Marion J. (Lew) Lewandowski*

12:00

EFFECTS OF PHYSICAL CHARACTERISTICS ON PREDICTED HEAT CASUALTY RATE

*Miyo Yokota and Xiaojiang Xu*

12:15

**Lunch**

1:15

VALIDATION OF A SIMULATION PROGRAM FOR THE THERMOREGULATION OF PATIENTS AND FIRE FIGHTERS

*Jochim Koch, Richard Kellner, Oliver Kimberger*

## **METHODS**

**Session Chair: Ingvar Holmer**

1:30

A CALORIMETRIC VALIDATION OF EVAPORATIVE AND DRY HEAT LOSSES MEASURED WITH HEAT FLOW TRANSDUCERS

*Michel B. DuCharme and Glen P. Kenny*

1:45

THE DOUBLE SENSOR - A NON-INVASIVE DEVICE TO CONTINUOUSLY MONITOR CORE TEMPERATURE IN HUMANS ON EARTH AND IN SPACE

*H.-C. Gunga, A. Werner, A. Stahn, M. Steinach, T. Schlabs, E. Koralewski, D. Kunz, D. L. Belavý, D. Felsenberg, F. Sattler, J. Koch*

2:00

VALIDATION OF A NON INVASIVE CORE TEMPERATURE SENSOR FOR NEONATES; ADULT PATIENTS AND FIRE FIGHTERS

*Jochim Koch, Frank Sattler, Oliver Kimberger, and Hanns Christian Gunga*

2:15

**Poster Session**

**TOURS TO HARVARD, INSTITUTE OF NANOTECHNOLOGY & FREEDOM TRAIL.  
SEE SIGN-UP SHEETS AT USARIEM EXHIBIT.**

## **DAY 4: THURSDAY, AUGUST 6, 2009**

8:30

### **KEYNOTE**

LOW-DOSE ASPIRIN AND CLOPIDOGREL ATTENUATE REFLEX CUTANEOUS VASODILATION IN MIDDLE AGED SKIN

*Lacy A. Holowatz*

Penn State University

**SUPPORTED BY GORE**

### **THERMAL CONTROL**

**Session Chair: Matt White**

9:00

THE EFFECT OF L-MENTHOL ON THERMOREGULATION AND SENSATION DURING EXERCISE IN WARM AND HUMID CONDITIONS

*D. Jason Gillis, Martin J. Barwood, and Michael J. Tipton*

**SUPPORTED BY GORE**

9:15

THE ROLES OF HANDS AND FEET IN TEMPERATURE REGULATION IN HOT AND COLD ENVIRONMENTS

*Nigel A.S. Taylor, Christiano A. Machado-Moreira, Anne M.J. van den Heuvel, Joanne N. Caldwell, Elizabeth A. Taylor, and Michael J. Tipton*

9:30

EXERCISE TRAINING DOES NOT INFLUENCE WHOLE BODY HEAT STORAGE DURING EXERCISE IN PREVIOUSLY SEDENTARY INDIVIDUALS

*Jill M. Stapleton, Daniel Gagnon, and Glen P. Kenny*

**SUPPORTED BY GORE**

9:45

**Break & Poster Session**

10:00

THE SYMPATHO-VAGAL REGULATION OF HEART RHYTHM DURING ACCLIMATION TO HEAT: ANALYZING HEART RATE VARIABILITY BY MEANS OF THE MULTIPOLE METHOD

*Y Epstein, DS Moran, Y Heled, A Hadid, R Kobo, M Lewkowicz, Y Shapiro, J Levitan*  
POSTER BOARD #1

DOES THE RATE OF THERMOREGULATORY SWEATING DEPEND ON THE RATE OF CHANGE OF CORE TEMPERATURE?

*Brian Farnworth, Michel B. DuCharme, Ollie Jay and Glen Kenny*

POSTER BOARD #2

RELATIONSHIP BETWEEN HEMODYNAMIC AND THERMOREGULATORY RESPONSES DURING THERMAL STIMULATION USING AMBIENT TEMPERATURE

*Joonhee Park, Jeongwha Choi, and Ilna Son*

POSTER BOARD #3

**SUPPORTED BY GORE**

THE EFFECT OF FLOOR HEATING SYSTEM ON PHYSIOLOGICAL AND PSYCHOLOGICAL RESPONSES SITTING POSTURE WITH THROWING LEGS

*Akira Kato, Yumi Hirasawa, Syohei Morimoto, Takashi Kubo, Sayaka Sugano, Masashi Kuramae, Takafumi Maeda, and Shintaro Yokoyama*

POSTER BOARD #4

**SUPPORTED BY GORE**

PRIOR HEAT STRESS: EFFECT ON SUBSEQUENT 15-MINUTE TIME TRIAL PERFORMANCE IN THE HEAT

*R.W. Kenefick, B.R. Ely, S.N. Cheuvront, L.J. Palombo, D.A. Goodman and M.N. Sawka*

POSTER BOARD #5

HEAT STRESS IN CANADIAN DEEP MECHANIZED MINES: LABORATORY SIMULATION OF TYPICAL MINING TASKS PERFORMED IN VARYING ENVIRONMENTS

*Glen P. Kenny, Jill Stapleton, Aaron Lynn, Konrad Binder, Cheryl Allen and Stephen G. Hardcastle*

POSTER BOARD #6

EFFECT OF HAIR STYLE ON HUMAN PHYSIOLOGICAL RESPONSES IN A HOT ENVIRONMENT

*Myung-Ju Kim, Jeong-Wha Choi, Hyung-Kook Lee*

POSTER BOARD #7

**SUPPORTED BY GORE**

COMPARISON OF PHYSIOLOGICAL VARIABLES AND BODY COMPOSITION VARIABLES AMONG WALKING TYPES ON TREADMILL

*Hyungkook Lee and Myungju Kim*

POSTER BOARD #8

**SUPPORTED BY GORE**

CHANGES IN RECUMBENT CYCLING CADENCE INFLUENCE HEART RATE VARIABILITY

*Heather Lunt, Martin J. Barwood, Jo Corbett, and Michael J. Tipton*

POSTER BOARD #9

**SUPPORTED BY GORE**

EFFECTS OF SHORT BOUTS OF FIREFIGHTING ACTIVITY ON PLATELET NUMBER AND AGGREGABILITY

*Denise L. Smith and Mark W. McDonough*

POSTER BOARD #10

USE OF A HEAT TOLERANCE TEST TO EVALUATE RETURN TO DUTY STATUS IN US NAVY AND MARINE CORPS PERSONNEL

*Jay H. Heaney, Jesse L. Hascall, Janine M. Wong, Evan C. Johnson, and Paul W. Miller*

POSTER BOARD #11

EFFECTS OF SEASONAL THERMAL AND LIGHTING ENVIRONMENT ON SLEEP IN ELDERLY LIVING IN THE DETACHED HOUSES

*Kazuyo Tsuzuki and Tomonori Sakoi*

POSTER BOARD #12

WAVELET-BASED ANALYSIS OF SKIN BLOOD FLOW AT LOWER LIMB UNDER EXTERNAL PRESSURE

*Yehu Lu, Xiaoqun Dai, Hong Lin, and Fuping Zhou*

POSTER BOARD #13

**THERMAL CONTROL**

10:45

SWEAT GLAND RECRUITMENT FOLLOWING THERMAL AND PSYCHOLOGICAL STIMULI

*Christiano A. Machado-Moreira, Elizabeth Edkins, Alexandre S. Iabushita, Peter Maruca, and Nigel A.S. Taylor*

**SUPPORTED BY GORE**

11:00

BODY MAPPING OF SWEATING IN MALE ATHLETES

*Caroline Smith and George Havenith*

**SUPPORTED BY GORE**

11:15

PHYSIOLOGICAL RESPONSES DURING 60 MIN LEG IMMERSION  
IN JAPANESE AND MALAYSIAN MALES

*Titis Wijayanto, Hitoshi Wakabayashi, Joo-Young Lee, Nobuko Hashiguchi,  
Mohamed Saat, Yutaka Tochihara*

**SUPPORTED BY GORE**

11:30

SWEAT GLAND FUNCTION IN THAI AND JAPANESE MALES IN RELATION TO  
PHYSICAL TRAINING

*Yoshimitsu Inoue, Hiroyuki Ueda, Toyoshi Kubota, Narihiko Kondo, Takaaki Matsumoto,  
Tharaporn Sutabhaha, Chucheep Praptittaya*

11:45

PERIPHERAL THERMAL THRESHOLDS AND THERMOEFFECTORS THRESHOLD  
ZONE IN MALAYSIAN AND JAPANESE MALES

*Joo-Young Lee, Mohamed Saat, Chin-Mei Chou, Titis Wijayanto,  
Hitoshi Wakabayashi, and Yutaka Tochihara*

**SUPPORTED BY GORE**

12:00

**Lunch**

1:00

## **SYMPOSIUM**

**BODY HEAT STORAGE AND WORK IN THE HEAT: A CALORIMETRIC  
PERSPECTIVE**

DIRECT CALORIMETRY & THERMOREGULATION

*Paul Webb*

AN IMPROVED METHOD FOR ESTIMATING THE RATE OF BODY HEAT STORAGE  
USING THERMOMETRY

*Ollie Jay*

THERMAL AND NON-THERMAL INFLUENCES ON WHOLE-BODY HEAT  
EXCHANGE AND HEAT BALANCE DURING HEAT STRESS

*Glen Kenny*

## **PHYSIOLOGY & PERFORMANCE**

**Session Chair: Nigel Taylor**

2:00

A COMPARISON OF THERMAL HYPERPNEA RESPONSES BETWEEN YOUNGER AND OLDER MALES DURING HYPERTHERMIA

*Matthew D White, Miriam E Clegg, Michael S Koehle, Kyong Tae Kim, Luisa V Giles and Michael L Walsh*

2:15

ECG AND HEART RATE DURING HELICOPTER UNDERWATER ESCAPE TRAINING (HUET) OF NOVICE TRAINEES

*Michael J. Tipton, Peter Gibbs, Chris Brooks, Dan Roiz de Sa, and Tara J. Reilly*

2:30

HEAT INTOLERANCE ASSESSMENT OF 367 POST HEAT STROKE CASES

*Moran DS., Heled Y., Erlich T., Yanovich Y., Hadid A., Shapiro Y., Epstein Y.*

2:45

THE EFFECT OF HEAT ACCLIMATION ON THERMAL STRAIN DURING EXPLOSIVE ORDNANCE DISPOSAL (EOD) RELATED ACTIVITY IN MODERATE AND HOT CONDITIONS

*C. D. Thake, M. J. Zurawlew, M. J. Price, and M. Oldroyd*

3:00

LIFESTYLE BEFORE RECRUITMENT AND STRESS FRACTURE OCCURRENCE DURING 12-MONTHS OF STRENUOUS TRAINING

*Arbel Y., Yanovich R., Erlich T., Finestone A., Evans. R., and Moran DS.*

**SUPPORTED BY GORE**

3:15

**Break & Poster Session**

3:45

HEMATOLOGICAL PROFILE OF FEMALE SOLDIERS UNDER DIFFERENT TASKS AND ENVIRONMENTAL CONDITIONS

*Yanovich R., Evans RK., Merkel D., Baum I., Erlich T., and Moran, DS.*

**SUPPORTED BY GORE**

## **HYPOXIA**

**Session Chair: Maria Koskolu**

4:00

RELIABILITY OF MEASURES OF AUTONOMIC ACTIVITY DURING ACUTE HYPOXIC EXPOSURES

*Heather Lunt, Martin J. Barwood, Jo Corbett, and Michael J. Tipton*

**SUPPORTED BY GORE**

4:15

RESPONSES TO ISOCAPNIC HYPOXIA IN A HOT WORK ENVIRONMENT DIFFER IN YOUNGER AND OLDER MALES

*Miriam E Clegg, Michael S Koehle, Kyong Tae Kim, Luisa V Giles, Michael L Walsh and Matthew D White*

**SUPPORTED BY GORE**

4:30

PHYSIOLOGICAL AND PSYCHOMOTOR PERFORMANCES IN HYPOXIC CONDITIONS AFTER HEAT ACCLIMATION

*Y Heled, A Peled, E Shargal, L Zigel, RP Burstein, Y Epstein, and DS Moran*

4:45

REDUCED COLD-INDUCED VASODILATION AT ALTITUDE: DUE TO HYPOXIC OR HYPOBARIC CIRCUMSTANCES?

*T. Meeuwssen, E.M. van Es, B. Smeets, J.D. Layden, R. Simons, and H.A.M. Daanen*

5:00

**ICEE 2011, Nafplio, Greece**

**Maria Koskolu**

## **DAY 5: FRIDAY, AUGUST 7, 2009**

### **COGNITION/PERCEPTION/COMFORT**

**Session Chairs: Michael Tipton & Hui Zhang**

8:30

THE SENSITIVITY OF INITIAL THERMAL PERCEPTIONS WHEN ALTERING LOCAL SKIN TEMPERATURES BY MODIFYING MICROCLIMATE RELATIVE HUMIDITY

*Mark Newton, Martin J. Barwood, and Michael J. Tipton*

8:45

PARAMETERIZATION OF TEMPERATURE PERCEPTION OF VENTILATION CHANGES IN FULL-FACE MOTORCYCLE HELMETS

*Cornelis P. Bogerd and Paul A. Brühwiler*

9:00

THE EFFECTS OF WEARING A FULL-FACE MOTORCYCLE HELMET ON COGNITIVE PERFORMANCE IN A WARM ENVIRONMENT

*Cornelis P. Bogerd, Kurt Strässle and Paul A. Brühwiler*

9:15

PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECT OF THE NEW CONTROL ALGORITHM ADAPTED TO THERMAL SENSIBILITY

*Lee Ju-Youn, Choi Ho-Seon, Oh Saikee, and Jeon Simon*

9:30

EFFECTS OF ACUTE COLD EXPOSURE ON COGNITIVE FUNCTION: EVIDENCE FOR SUSTAINED IMPAIRMENT

*John Gunstad, Joseph Smith, Matthew Muller, John Updegraff, Mary Beth Spitznagel, Ashley Szabo, Katherine Pierce, Ellen Glickman*

9:45

COMBINED EFFECTS OF COLD EXPOSURE AND 53 HOURS OF SLEEP DEPRIVATION ON A SUSTAINED ATTENTION TASK

*GH Kamimori, K Pierce, T Collinsworth, D Bellar, E Glickman*

10:00

### **Break & Poster Session**

CAN BRAIN ACTIVITY BE USED AS AN OBJECTIVE MEASURE OF THERMAL PERCEPTION?

*Sarah L. Davey, Geoff Holman, and Michael J. Tipton*

POSTER BOARD #1

**SUPPORTED BY GORE**

EFFECTS OF LOWER BODY WARMING ON PHYSIOLOGICAL AND PSYCHOLOGICAL RESPONSES OF HUMANS

*Hikaru Enomoto, Teruyuki Kumamoto, and Yutaka Tochihara*

POSTER BOARD #2

THE EFFECT OF TWO CYCLING HELMETS ON THERMOREGULATION AND THERMAL PERCEPTION DURING EXERCISE IN WARM AND HUMID CONDITIONS

*D. Jason Gillis, Martin J. Barwood, Geoffrey M. Long, and Michael J. Tipton*

POSTER BOARD #3

**SUPPORTED BY GORE**

A COMPARISON OF DATA COLLECTION METHODS FOR MEASURING THERMAL COMFORT ON TRAIN JOURNEYS

*Lisa Kelly, Rebecca Dilloway, and Ken Parsons*

POSTER BOARD #4

**SUPPORTED BY GORE**

THERMAL COMFORT WHEN BOARDING TRAINS – PRELIMINARY DATA

*Lisa Kelly, Simon Hodder, and Ken Parsons*

POSTER BOARD #5

**SUPPORTED BY GORE**

**COGNITION/PERCEPTION/COMFORT**

10:45

THE INFLUENCE OF THE RATE OF TORSO SKIN TEMPERATURE CHANGE ON THERMAL PERCEPTIONS WHILST EXERCISING IN THE HEAT

*Sarah L. Davey, Martin J. Barwood, and Michael J. Tipton*

**SUPPORTED BY GORE**

11:00

INITIAL THERMAL SENSATION RESPONSES TO SIMULATED SOLAR RADIATION

*Simon Hodder and Ken Parsons*

11:15

ENERGY SAVINGS FROM EXTENDED AIR TEMPERATURE SETPOINTS AND REDUCTIONS IN ROOM AIR MIXING

*Tyler Hoyt, Kwang Ho Lee, Hui Zhang, Edward Arens, and Tom Webster*

11:30

PHYSIOLOGICAL, PERCEPTUAL AND COGNITIVE RESPONSES TO CONDUCTING NUCLEAR DECOMMISSIONING RELATED ACTIVITIES WHEN WEARING A PRESSURISED BREATHING AIR SUIT (PBAS) IN MODERATE AND HOT CONDITIONS

*C. D. Thake and C. Simons*

11:45

**CLOSING REMARKS & ADJOURNMENT**

ICEE 2011

Nafplio, Greece



Exhibitor

**humanikin**  
*intelligent thermal control*