

The 10th European Conference on Protective Clothing

Protection challenges in a changing world

May 9 – May 12 2023, Arnhem, The Netherlands

Tuesday, May 9

11:00-13:00	ESPC board meeting at NIPV Arnhem	
13:00-14:30	Arrival of conference attendees at NIPV Arnhem, registration, networking	
14:30-15:15	Conference opening, presentation of the sponsors, announcements	
15:15-16:15	Keynote 1	
	Joo-Young Lee	Non-invasive wearable technologies to monitor heat strain
16:15-16:30	Coffee break	
16:30-17:15	Session 1	
	Innovative protective products	
O1	Daniela Zavec, Klaus Richter, Ella Lachmann, Irina Cherunova, Nikolai Kornev, Guobin Jia and Jonathan Plentz	ArTiShirt – WORKWEAR FOR COLD AND ARCTIC TEMPERATURES
O2	Anna Dąbrowska, Monika Kobus, Piotr Sowiński, Łukasz Starzak and Bartosz Pękosławski	INTEGRATION OF ACTIVE CLOTHING WITH PERSONAL COOLING SYSTEM WITHIN NGIOT ARCHITECTURE FOR IMPROVED COMFORT OF CONSTRUCTION WORKERS
O3	Soraia Neves, Margarida Silva, João Ribeiro, Adriana Moreira, Patrícia Fernandes, Francisca Miranda, Gilda Santos, Rita Marques, João Miranda and João Campos	COMBINATION OF TEXTILES AND PHASE CHANGE MATERIALS FOR TEMPERATURE MANAGEMENT OF A NEW FIREFIGHTER PROTECTIVE VEST
17:15-20:00	Return to the hotels	
20:00-21:30	Get-together at Hotel Haarhuis	

Wednesday, May 10

08:15-08:30	Arrival at NIPV, announcements	
08:30-10:00	Session 2	
	Keynote 2	
	Physiological impact of protective clothing and environment	
08:30-09:00	George Havenith, Josh Foster, James Smallcombe and Simon Hodder	WORKER PROTECTION IN A WARMING WORLD – MODELLING THE IMPACT OF CLIMATE AND CLOTHING ON PHYSICAL WORK CAPACITY
O4	Faming Wang	HEALTHY SHIFT WORK DURATION AND THE RISK OF HEATSTROKE AMONG COVID-19 HEALTH CARE WORKERS IN 34 CHINESE CITIES AT PEAK SUMMER TEMPERATURES
O5	Sirkka Rissanen, Ari-Pekka Rauttola, Juha Oksa and Satu Mänttari	PHYSIOLOGICAL STRAIN DURING MINE RESCUE EXERCISE
O6	Juhyun Moon, Siyeon Kim, Cho-Eun Lee, Yujean Ghim, Min-Seo Kim and Joo-Young Lee	AIR-COOLING VEST IS EFFECTIVE BUT NOT SUFFICIENT TO ALLEVIATE PHYSIOLOGICAL AND PERCEPTUAL HEAT STRAIN OF WORKERS IN A HOT AND HUMID ENVIRONMENT
O7	Hyeslin Yoon	PHYSIOLOGICAL IMPACTS AND SUBJECTIVE COMFORT FEELINGS BY THE AMOUNT OF THE TOTAL HEAT TRANSFER THROUGH MATERIALS
10:00-10:30	Posters, exhibition and coffee break	
10:30-12:00	Session 3	
	Symposium: Digital Human Models and Virtual Ergonomics of PPE Systems	
O8 (5 min)	Peter Bröde, Edith Classen, Jean Léonard, Ronald Heus and Kalev Kuklane	Digital Human Models And Virtual Ergonomics Of PPE Systems – A Standardization Perspective
O9	Paul Brassier	Scenario Dependent Optimizing The Protective Ability Of Ppe Against Its Physiological Burden
O10	Miriam Martinez Albert	DEVELOPMENT OF A NEW TESTING PROTOCOL TO EVALUATE COOLING SYSTEMS
O11	Kalev Kuklane	Firefighter clothing database: preliminary modelling and exposure predictions
O12	Yordan Kyosev, Dominik Münks and Felix Kunzelmann	POSSIBILITIES FOR ANALYSIS OF THE MOTION COMFORT OF PROTECTIVE CLOTHING USING HIGH SPEED (4D) BODY SCANNING
O13 (10 min)	Timofey Golubev, Mark Hepokoski, Kevin Ward and Joel Coffel	Employing Human Thermal Modelling to Assess the Effect of Sweat Accumulation on Body Temperatures
	Panel discussion	
12:00-13:00	Lunch	

13:00-13:45	Session 4	Manikins and models
O14	Kamila Lunerova, Michal Masin, David Kaiser, Vladimira Fialova, Jan Pokorny, Barbora Rehak Kopeckova and Jan Fiser	APPLICABILITY OF HUMAN THERMOPHYSIOLOGICAL MODEL FOR PREDICTION OF THERMAL STRAIN IN PPE
O15	Seojin Lee, Sora Shin, Daeyoung Lim and Siyeon Kim	A COMPARISON OF THERMAL MANIKIN TEST METHODS TO ASSESS COOLING EFFICIENCY OF COOLING VESTS
O16	Kalev Kuklane, Koen Levels, Marijne de Weerd, Lennart Teunissen, Jakob Eggeling and Maurice Kemmeren	COMPARISON OF CLOTHING MEASUREMENTS ON 2 MANIKINS IN THE LIGHT OF SIZE AND FIT
13:45-14:15	Main poster session with pitches (à 2-3 min)	
P1	Yiming Huang, Jikun Liu, Faming Wang and Jie Yang	The study on the ergonomics of firefighters' personal protective clothing based on 3D motion capture
P2	Tim Harten, Kalev Kuklane, Ronald Heus and Hein Daanen	ERGONOMIC AND PERFORMANCE DIFFERENCES BETWEEN FIREFIGHTER PROTECTIVE CLOTHING SYSTEMS
P3	Peter Bröde, Maren Claus, Doris Urlaub, Natalie Wolfsdorff and Carsten Watzl	Immune Age: The Feminine Side of Firemen?
P4	Faming Wang	IMPACT OF CONTINUOUS CHRONIC COOL AIR EXPOSURE ON LUNG AND LIVER FUNCTIONS
P5	Eunju Lee, Yeonwoo Jung, Seung-wook Han and Siyeon Kim	3D VIRTUAL MODEL CONSTRUCTION OF FILTER MEMBRANE AND MULTILAYERED FABRIC STRUCTURE OF FIREFIGHTERS' PARTICULATE HOODS TO SIMULATE PARTICLE LOADING BEHAVIOR
P6	Siyeon Kim, Jungteak Oh and Seojin Lee	DEGRADATION IN TENSILE STRENGTH OF FLAME-RETARDANT TEXTILES AFTER EXPOSURE TO HIGH TEMPERATURE AND HIGH HUMIDITY AND SUGGESTIONS FOR AN ACCELERATED HYDROLYSIS TEST DEVELOPMENT
P7	Cho-Eun Lee, Juhyun Moon, Byung-Hee Hong, Joo-Young Lee, Yujean Ghim and Min-seo Kim	COOLING EFFECTS OF A GRAPHENE OXIDE-COATED SHEET TO ALLEVIATE EXERTIONAL HYPERTHERMIA
P8	Seyoung Jeon and Hyojeong Lee	Development of digital garment clothing pressure distribution using 3D vector projection
P9	Anna Dąbrowska, Monika Kobus, Piotr Sowiński and Anita Jachowicz	EVALUATION OF HEALTH TRACKER'S FUNCTIONALITY IN TERMS OF ITS POTENTIAL APPLICATION TO CONTROL THE OPERATION OF PROTECTIVE CLOTHING WITH COOLING FUNCTION
P10	Mark Gaskill and Robert Ormond	ASSESSMENT OF FIRE INVESTIGATOR ENSEMBLES AGAINST CHEMICAL VAPOR AND AIRBORNE PARTICLE INFILTRATION
P11	Parris Tysinger, Bryan Ormond and Chandler Probert	PRELIMINARY RESEARCH TO DETERMINE EFFECTIVENESS OF ON-SCENE HOSE DECONTAMINATION THROUGH COMPARISON OF DIFFERENT ANALYSIS TECHNIQUES

14:15-15:00	Main poster session continues with exhibition and coffee break	
15:00-16:15	Session 5	New materials and evaluation methods
O17	Bianca-Michaela Wöfling, Serge Lang and Edith Classen	Research and development of simplified ways to comprehensively evaluate thermophysiological comfort for complex PPE garment systems
O18	Jakob Eggeling, Róbert Toma and Kalev Kuklane	A NEW APPROACH TO ESTIMATE RET VALUES
O19	Ye-Sung Cho, Hee-Young Ju, Hyun-Soo Kim and Joo-Young Lee	ACTIVE HEATING SHIRTS FOR WORKERS IN COLD ENVIRONMENTS: WHICH COMBINATION IS MORE EFFECTIVE?
O20	Bengi Kutlu and Cansel Emir	EFFECTS OF TANNIC ACID ON FLAME RETARDANT PROPERTIES OF JUTE
O21	Ana Rita Sousa, José Barbosa, O. Salomé G.P. Soares, João Ferreira, Ana Gonçalves, Gilda Santos, Augusta Silva, José Morgado, Patrícia Soares, Sergey A. Bunyaev, Gleb N. Kakazei, Cristina Freire, M. Fernando R. Pereira, Clara Pereira and André M. Pereira	TAILORED MATERIALS FOR ELECTROMAGNETIC SHIELDING TEXTILE APPLICATION
O22	Anugrah Shaw, Thavy Staal, Marcelo Macedo, Hamilton Ramos and Sonja Sterman	USER INPUT FOR PPE FOR PESTICIDE OPERATORS: A GLOBAL FRAMEWORK FOR DATA COLLECTION
16:15-16:30	Coffee break	
16:30-17:30	ESPC General Assembly for all participants	
17:30-...	Possibilities for company visits	

Thursday, May 11**Firefighter Theme Day**

08:15-08:30		Arrival at NIPV
08:30-08:45		Opening of the Day, presentation of the relevant sponsors, announcements
09:15-10:00	Session 6 Keynote 3	Wildland firefighting and other operational conditions
08:45-09:15	Philippe Agopian, Frank Pons and Thierry Carret	Health management of firefighters during natural wild fires. A global and integrated approach
O23	Jelmer Dam, Maurice Kemmeren and Kalev Kuklane	From Urban Structural Firefighting to Wildland-Firefighting – a Northwest European journey
O24	Maurice Kemmeren, Dirk Hageböiling, Kalev Kuklane and Ronald Heus	Higher standardised test performance of PPE materials does not automatically lead to higher safety
O25	Rijk van den Dikkenberg and Ricardo Weewer	WHEN WATER GOES UP IN SMOKE, EXPERIMENTAL RESEARCH INTO THE EFFECT OF THE 3D PULSE METHOD AND THE ARC METHOD ON SMOKE COOLING
10:00-10:30		Posters, exhibition and coffee break
10:30-12:00	Session 7	Ergonomic testing and human studies of clothing systems
O26	Ronald Heus, Maurice Kemmeren, Lyda Kistemaker and Kalev Kuklane	TESTS FOR ERGONOMIC EVALUATION OF FIREFIGHTERS' PROTECTIVE CLOTHING
O27	Eric Mol and Ronald Heus	(PSYCHO)PHYSIOLOGICAL EFFECTS OF WEARING TASKSPECIFIC PROTECTIVE CLOTHING FOR WILDLAND FIREFIGHTERS
O28	Cassandra Kwon and Meredith McQuerry	EVALUATING FEMALE FIREFIGHTER ANTHROPOMETRICS FOR IMPROVED MOBILITY AND DESIGN IN PERSONAL PROTECTIVE CLOTHING FOR THE UNITED STATES FIRE SERVICE
O29	Gilda Santos, André Barbosa and Ana Barros	DEVELOPMENT OF AN OBSTACLE COURSE TO EVALUATE THE ERGONOMICS OF MILITARY PROTOTYPES
O30	Inga Dabolina, Valdis Cielens and Eva Lapkovska	PROCEDURES FOR USE OF PERSONAL PROTECTIVE CLOTHING, ITS ERGONOMICS
O31	Aarti Solanki and Prof Dr. Pavan Godiawala	Knowledge Mapping of Ergonomics issue in firefighting protective clothing
12:00-13:00		Lunch
13:00-14:30	Session 8	Evaluation of firefighter clothing materials performance
O33	Guowen Song, Yulin Wu and Rui Li	POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) SIMULATION FOR STANDARDIZED PPE CONTAMINATION USING A CONE CALORIMETER
O34	Vera De Glas	Risk Assessment Report (RAR) of polycyclic aromatic hydrocarbons (PAHS) in firefighters and instructors
O35	Bryan Ormond, Arjunsing Girase, Nur-Us-Shafa Mazumder, Jingtian Lu and Andrew Hall	TRANSITIONING THE FIRE SERVICE TO PFAS-FREE ALTERNATIVES: TRADE-OFFS IN EXPOSURE AND PERFORMANCE
O36	Laura Munevar-Ortiz, John A. Nychka and Patricia I. Dolez	ACCELERATED AGING OF MOISTURE BARRIERS USED IN FIREFIGHTERS' PROTECTIVE CLOTHING
O37	Md. Saiful Hoque and Patricia Dolez	AGING OF FIREFIGHTER OUTER SHELL FABRICS UNDER ACCELERATED CONDITIONS
O38	André Fonseca Malaquias, João Mário Miranda and J.B.L.M. Campos	Utilization of Moisture Barriers with Enhanced Tortuosity and Porous Attachments to Mitigate Burns Introduced by Impermeability: A Numerical Study
14:30-15:00		Posters, exhibition and coffee break
15:00-16:30	Session 9	Smart protection and innovative solutions in firefighter protection
O39	Martin Camenzind, Ivona Jerkovic, Elodie Morlec and Rene Michel Rossi	Adaptable thermal insulation for heat and flame protection on demand
O40	Edgar Garcia Torres and Emiel Denhartog	THE EFFECT OF WIND SPEED, VENTILATION, AIR LAYER THICKNESS, AND AIR PERMEABILITY ON HEAT FLUX IN TWO-LAYER SYSTEMS
O41	Gilda Santos, Soraia Neves, Margarida Silva, João M. Miranda, João B. L. Campos, J. Ribeiro, A. Moreira, P. Fernandes, F. Miranda and Rita Marques	SMART FIREFIGHTERS PPE: IMPACT OF PHASE CHANGE MATERIALS
O42	Maria Stenkina, Ga-Young Lim, Yujean Ghim, Hyun-Soo Kim and Joo-Young Lee	RELATIONSHIPS BETWEEN BODY MORPHOLOGICAL FACTORS, CORE TEMPERATURE, AND HEAT EXTRACTION FROM THE UPPER ARM THROUGH A LIQUID COOLING SLEEVE DURING CYCLING EXERCISE
O43	Patricia Dolez, Hyun-Joong Chung, Jane Batcheller, Chungyeon Cho, Diana Yehia, Lelin Zheng, Christina Braun, Reza Khalkhali, Zhitong Lin, Ashok Chhetry, Ankit Saha, Md. Saiful Hoque, Marwa Khemir and Nadeesha Samaraweera	DEVELOPMENT OF GRAPHENE-BASED END-OF-LIFE SENSORS FOR FIRE-PROTECTIVE FABRICS
		Panel discussion
16:30-22:00		Social event in Open air museum - conference dinner (optional)

Friday, May 12

08:15-08:30		Arrival at NIPV, announcements
08:30-10:00	Session 10	Sustainability in protective clothing and equipment
08:30-09:00	Keynote 4	
	Edith Classen	HOW DOES CIRCULAR ECONOMY INFLUENCE PPE?
O44	Rahel Krause, Lilin Feng, Roshan Paul, Isa Bettermann, Thomas Gries, Ulrich Schwaneberg, Claus Hummelsheim and Lampros Kampas	DEVELOPMENT OF AN ALTERNATIVE FLAME RETARDANT FINISH FOR TEXTILES FOR FIRE PROTECTION APPLICATIONS AND AN ADAPTED FINISHING PROCESS
O45	Chloe Caux-Wetherell and Eric van Wely	DuPont Launches New Flame-Resistant Fabric with Bio-Based Chemical-Repellent Finish
O46	G M Nazmul Islam, Dave Kasper, Ted Parker, Jane Batcheller and Patricia Dolez	RECYCLING OF POST-CONSUMER FLAME-RESISTANT PROTECTIVE CLOTHING
O47	Alexander Gstettner	Sustainability In Flame Resistant Protective Clothing with LENZING™ fibers – The Day After Tomorrow
10:00-10:30		Posters, exhibition and coffee break
10:30-12:00	Session 11	Medical protection - innovation in production and respiratory protection
O48	Frederik Goethals and Peter Hazendonk	SIMULATION OF A RAPIDLY DEPLOYMENT OF AN EMERGENCY HOSPITAL
O49	Gertrude Kignelman, Frederik Goethals, Silvia Pavlidou, Hannu Salmela, Anna Nardi and Marion Real	BLUEPRINT FOR TESTING AND CERTIFICATION OF PROTECTIVE EQUIPMENT IN EMERGENCIES
O50	Bert Groenendaal	RE-DESIGN OF TEXTILE PROTECTIVE EQUIPMENT FOR PRODUCTION VIA ALTERNATIVE LINES IN CASE OF SPIKING DEMAND TIMES
O51	Melissa Armistead, Anuja Dandekar, Marc Mathews and R. Bryan Ormond	DEVELOPMENT OF AN ANIMATRONIC HEADFORM TEST METHOD TO EVALUATE THE EFFICACY OF BARRIER FACE COVERINGS
O52	Didem Kiryaman, Kaushik Nonavinakere Vinod, Emiel Den Hartog and Tiegang Fang	Filtration Performance of Cloth Masks with Different Air permeability Worn Over a Surgical Mask
O53	Jenni Kaisto, Sirkka Rissanen and Kirsi Jussila	PROTECTION OF FACE AGAINST COOLING WHILE USING POWERED AIR PURIFYING RESPIRATORS IN THE COLD
12:00-13:00		Lunch
13:00-14:30	Session 12	Chemical protection, cleaning, decontamination
O54	Kirsi Jussila and Susanna Mäki	DEVELOPMENT OF PROTECTIVE CLOTHING AGAINST HOT LIQUID ALKALINE SPLASHES
O55	Kiarash Arangdad	SUSTAINABLE ALTERNATIVES TO FLUORINATED WATER REPELLENT PROTECTIVE FABRICS
O56	Selcen Kilinc-Balci, Zafer Kahveci, Christian Coby and Patrick Yorio	HOW DO DISINFECTING WIPES IMPACT THE BARRIER PERFORMANCE OF PROTECTIVE CLOTHING?
O57	Thomas Verminck and Nils Van de Vloed	Decontamination of EN469 fire gear as an essential part of the firefighters preventive measures against cancer
O58		
O59		
14:30-15:00		Closing of the conference (awards, next conference)
15:00-...		Possibilities for company visits

