

# DAY 1

Scientific Tracks & Abstracts



1<sup>st</sup> Edition of International Conference on  
**Ergonomics & Human Factors**

July 26-27, 2018 | Rome, Italy

**DAY 1**  
July 26, 2018

## Sessions

**Musculoskeletal Disorders | Vision Problems  
Physiotherapy | Individual-Related Risk Factors  
Anthropometry | Social Environment | Human  
Factors Engineering**

### Session Chair

**Natasa Vujica Herzog**  
University of Maribor, Slovenia

### Session Co-Chair

**Ozlem Kaya**  
Hitit University, Turkey

### Session Introduction

- Title: Prediction of neck flexion based on angles of a smartphone**  
**Jaehyun Park**, Incheon National University, Republic of Korea
- Title: Physical stress management by operative assignment in assembly processes**  
**Fabio Fruggiero**, University of Basilicata, Italy
- Title: Noise effects: Measured noise levels versus personal perceptions**  
**Natasa Vujica Herzog**, University of Maribor, Slovenia
- Title: Stress and burnout as a psycho-social risk at public sector among workers**  
**Serpil Aytac**, University of Uludag, Turkey
- Title: Bricklayer-assistant's work analysis: Weight lifting risks's in mortar's preparation tasks**  
**Argoub Mohammed**, Ibn Khaldoune University & University of Oran 2, Algeria
- Title: Ergonomic design of workstations (Turkey ready-made clothing sector case)**  
**Ozlem Kaya**, Hitit University, Turkey
- Title: The prevalence and risk exposure levels of work related musculoskeletal disorders in a Chinese shipyard**  
**Ying Qu**, National Institute of Occupational Health and Poison Control, China
- Title: The influence of gender on performance of common clinical procedures in an acute Irish Hospital**  
**Domhnall McGlacken-Byrne**, St. James's Hospital, Ireland

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Jaehyun Park et al., Arch Med 2018, Volume 10  
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## PREDICTION OF NECK FLEXION BASED ON ANGLES OF A SMARTPHONE

**Jaehyun Park** and **Nahyeong Kim**

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The text neck syndrome is becoming known as people start using their smartphones anytime, anywhere. A person's spine can be in trouble if it remains static for a long period of time with a load on it. Smartphones can handle many things on a small screen, so they can be used in a variety of situations. In particular, those situations can have a negative effect on the cervical spine. In this study, eighteen participants were recruited and their posture was analyzed. We used inertial measurement units (IMU) based motion analysis equipment (i.e., Noraxon MyoMotion) to determine the effect of smartphones on their posture when standing or sitting. Each participant was asked to perform two tasks: reading the document and playing a specific game. In this process, information about the posture of each participant as well as the angle of the smartphone was collected. As a result of experiment, we could develop the relationship between posture of participants and angles of smartphones to induce participants posture according to angles of smartphones. This study is expected to be used as the basic data for the research related to the text neck syndrome.

### Recent Publications

1. Kim H K et al. (2018) Virtual reality sickness questionnaire (VRSQ): motion sickness measurement index in a virtual reality environment. *Applied Ergonomics* 69:66-73.

2. Kim H K et al. (2016) The interaction experiences of visually impaired people with assistive technology: A case study of smartphones. *International Journal of Industrial Ergonomics*. 55:22-33.
3. Kim H K et al. (2016) Identifying affect elements based on a conceptual model of affect: A case study on a smartphone. *International Journal of Industrial Ergonomics*. 53:193-204.
4. Park J (2016) Classifying weight training workouts with deep convolutional neural networks: A precedent study. *MobileHCI Adjunct*. Doi:10.1145/2957265.2961861.
5. Park J et al. (2015) Developing and verifying a questionnaire for evaluating user value of a mobile device. *Human Factors and Ergonomics in Manufacturing & Service Industries*. 25(6):724-739.

### Biography

Jaehyun Park is an Assistant Professor in the Department of Industrial and Management Engineering at Incheon National University (INU). He received B.S degree and Ph.D degree in Industrial and Management Engineering from POSTECH (Pohang University of Science and Technology). His research interests are user experience of products and services, computational cognitive engineering, and machine learning on physical behaviour.

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## PHYSICAL STRESS MANAGEMENT BY OPERATIVE ASSIGNMENT IN ASSEMBLY PROCESSES

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**T**his study proposes a methodological review and an illustrative example for the physical stress management in manufacturing system. In particular, it investigates the complexity of human factors, as related with ergonomics and fatigue, and their interaction with resources and operational rules in flow assembly line. The paper implements system dynamics and agents based approach to overcome discrete events ineffectiveness. On managerial pursuit, correlation between relevant variables and states in system are evaluated as per optimal production requirements. Criticality on operating rules as related to the evaluation of physical stress in manufacturing tasks are reported. ANOVA tests were discussed. Conclusions in terms of optimal assignment of operators to workstation and moving choice between workstation are reported as related with system and human effects.

### Recent Publications

1. F Fruggiero et al. (2017) The role of uncertainty in supply chains under dynamic modeling. *International Journal of Industrial Computations*. 8(1):119-140. Doi:10.5267/j.ijiec.2016.6.003.
2. F Fruggiero et al. (2017) A model for break scheduling assessment in manufacturing systems. *Computers & Industrial Engineering*. 111:563-580. Doi: 10.1016/j.cie.2017.05.017.
3. F Fruggiero et al. (2017) A new mixed production cost allocation model for additive manufacturing (MiProCAMAM). *The International Journal of Advanced Manufacturing Technology*. 92(9-12):4275-4291. Doi:10.1007/s00170-017-0492-x.
4. F Fruggiero et al. (2017) Hybrid Genetic Bees

Algorithm applied to single machine scheduling with earliness and tardiness penalties. *Computers & Industrial Engineering*. 113:842-858. Doi:10.1016/j.cie.2017.07.018.

5. F Fruggiero et al. (2017) A new perspective for production process analysis using additive manufacturing-complexity vs production volume. *The International Journal of Advanced Manufacturing Technology*. 95(1-4):673-685. Doi:10.1007/s00170-017-1221-1.

### Biography

F Fruggiero is an Assistant Professor, and responsible for the area and lab, in Industrial Systems Engineering at the School of Engineering – Mechanical Engineering Area - of the University of Basilicata- Italy. He runs courses for both Industrial System Engineering and Operations Management. He works as Referee for different International Journals (e.g., IJSOI, IJAMT, IJPR, CPPB, EIS, TPMR, TSMSI, IJEBM, UHSE, Cogent OA etc.) and the National Minister of Research. He Chaired for Human Factor and Ergonomics in IEOM - Industrial Engineering and Operations Management Society Conference. He has been engaged in the auto sector for both human factor analysis and ergonomic research, scheduling optimization, production management. He has collaboration with firms of the production and service sector applying the results of his work to help multinational companies and SMEs to generate safety and optimize services and profits. He is an acting Consultant to several major companies and patent initiatives. He is active in initiating knowledge transfer to industry. His research activity encompasses the area of human factor and corporate strategy; industrial system design processes; additive manufacturing and advanced manufacturing; simulation and virtual modelling; agent based modelling; assembly line balancing; healthcare management and clinical risk assessment; scheduling and optimisation; safety and risk analysis.

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## NOISE EFFECTS: MEASURED NOISE LEVELS VERSUS PERSONAL PERCEPTIONS

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Noise is recognized as an important stress factor in numerous workplaces. Despite legal regulations and recommendations for the highest allowed noise levels, there are still many problems in practice resulting from noise exposure such as hearing loss, stress and significant discomfort. We studied the influence of noise on workers in two different environments: a technical high school and a manufacturing company. In both cases measurements of noise levels and corresponding frequency noise analyses were performed. In order to study personal noise perceptions, the workers also completed an extended research survey. A comparison between the survey's results and experimentally determined noise levels gives new insights into the health risks of noise exposure in two very different working environments.

### Recent Publications

1. Gajšek B, Vujica Herzog N, Butlewski M, Đukić G (2017) Research opportunity: incorporation of human factors in order picking system models. *Zeszyty Naukowe Politechniki Poznańskiej : Organizacja i Zarządzanie*, 72:45-61.
2. Vujica Herzog N, Zavec Pavlinič D, Kuzmanović BD, Buchmeister B (2016) Thermal manikin and its stability for accurate and repeatable measurements. *International journal of simulation modelling*, 15:676-687,

3. Šauperl O, Vujica Herzog N, (2014) Workplace design in the clothing shop by considering anthropometry. *Asian academic research journal of multidisciplinary*, 1:107-122.
4. Vujica Herzog N, Vujica Beharić R, Beharić A, Buchmeister B (2014). Ergonomic analysis of ophthalmic nurse workplace using 3D simulation. *International journal of simulation modelling*, 13: 409-418.
5. Polajnar A, Vujica Herzog N, Buchmeister B, Jevšnik S (2012), Strains and stresses of workers caused by exposure to noise. *Collegium antropologicum*, 36:899-909.

### Biography

Natasa Vujica Herzog is an Associate Professor at the Faculty of Mechanical Engineering, University of Maribor, Slovenia. Her research area is operations and production management in particularly ergonomics. She is author or co-author of more than 100 publications, several original scientific articles published in international journals, monographs, and chapters in scientific books.

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Serpil Aytac, Arch Med 2018, Volume 10  
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## STRESS AND BURNOUT AS A PSYCHO-SOCIAL RISK AT PUBLIC SECTOR AMONG WORKERS

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The present study aimed to examine the relationships between occupational stress, burnout situations as a psycho-social risk and the subtypes that of the application job-related affective well-being according to the demographic factors among public sector employees. In the study, data were collected by questionnaire method. The research was conducted on 185 public officials who participated in the training during the "stress and burnout training" given to the public sector workers, and the total of 177 questionnaires was evaluated because 8 of the questionnaires were missing and incorrectly filled. In this study, a 7-item job stress scale developed by House and Rizzo (1972) was used to measure the psychological and psychosomatic symptoms related to the stresses experienced by public officials in the workplace. To measure burnout, Maslach Burnout Inventory developed Maslach and Jackson (1981) were used. The emotional exhaustion sub-dimension consists of 9 items, the depersonalization sub-dimension consists of 5 items and the personal accomplishment sub-dimension consists of a total of eight items in the Burnout Inventory consisting of 22 items and three sub-dimensions. To measure Job-related well-being Job-Related Affective Well-being Scale (JAWS) was used that has been designed by Katwyk, Fox, Spector, Kelloway (2000). The main objective of the study was based on the expectancy that the four subtypes of JAWS would show consistent and predictable correlations with Stress and Burnout. The average age of the participants is 36.82±8.36. Data were analyzed with T-test, Pearson Correlation, and One-Way ANOVA. The findings of the present study have shown that the meaningful relationships among job stress, burnout and job well-being. According to the obtained results, it was understood that the stress and burnout levels differed according to the gender of the public servants, the duration of their service, their place of duty, their administrative relative, education level and their workings ( $p<0.05$ ). In addition, when the mean differences between the scale scores according to gender were examined, it was seen that there was a significant difference between the emotional exhaustion from the subscales of the consumption

and the sex.

### Recent Publications

1. S Aytac, S Dursun and M Aytac (2017) Work-related violence and stress: the case of taxi drivers in Turkey. *International Journal of Recent Advances in Organizational Behaviour and Decision Sciences*. 3(1):929-938.
2. S Aytac (2017) Life satisfaction and leisure activities among retirees: the case of a city. *International Journal of Recent Advances in Organizational Behaviour and Decision Sciences*. 3(1):916-928.
3. S Aytac and G Akalp (2017) The attribution theory of as a psycho-social approach to the perception of occupational health and safety: a focus group study among women workers in metal industry. *European Journal of Multidisciplinary Studies*. 5(1):355-362. Doi:10.26417/ejms.v5i1.p355-362
4. S Aytac and S Dursun (2012) The effect on employees of violence climate in the workplace, work: *Work*. 41(1):3026-3031. Doi:10.3233/WOR-2012-0559-3026.
5. C Ceylan, J Dul and S Aytac (2008) Can the office environment stimulate a manager's creativity? *Human Factors and Ergonomics in Manufacturing*. 18(6):589-602. Doi:10.1002/hfm.

### Biography

Serpil Aytac has completed her PhD at the Uludag University, Turkey. She is the Director of Labour Economics and Industrial Relations Department. She has published more than 30 papers in reputed journals and has been serving as an editorial board member of repute. She was the Director of numerous research projects. She currently has national and international publications on work psychology and management. She is a Member of Turkish Ergonomics Society Association.

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Argoub Mohammed et al., Arch Med 2018, Volume 10  
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## BRICKLAYER-ASSISTANTS WORK ANALYSIS: WEIGHT LIFTING RISKS IN MORTAR'S PREPARATION TASKS

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Construction tasks are diverse, containing many weight handling duties. Bricklayer-assistant's work is one of the most demanding jobs in this respect. This job has a poor record of occupational health, in particular with regard to WMSDs (Valero, 2016). At the work site, the most demanding tasks for the assistant, in terms of physical work are: manual lifting, transportation and carrying of materials and pushing/pulling wheelbarrows for more than four hours every working day (van der Molen et al., 2017). Construction workers are exposed to a wide variety of health hazards at work (Alazab, 2004). Working in the construction industry typically requires awkward postures, heavy lifting, and considerable exertion. Many workers performing such tasks complain of discomfort in their upper extremities and lower back over the course of a workday (Buchholz et al., 1996; Jeong, 1998; Hoozemans et al., 2001; Davis et al., 2010). Several studies identified that there is a relationship between awkward postures and pain symptoms and injuries in the musculoskeletal system (Grandjean and Hunting, 1977; Corlett and Manenica, 1980; Westgaard and Aar, 1984; Haslegrave, 1994). WMSDs represent major health issues for construction workers yet risk factors associated with repetitive lifting tasks remain unexplored (Antwi, 2017). This job is more labor-intensive compared to other industries. Over long periods of time, this sustained physical labor causes bodily injuries to the workers which in turn, conveys huge losses to the industry in terms of money, time, and productivity. Various safety and health organizations have established rules and regulations that limit the amount and intensity of workers' physical movements to mitigate work-related bodily injuries (Nath, 2017). Awkward postures in construction activities pose substantial hazards in both instantaneous injuries and long-term WMSDs (Chen, 2017). According to official figures, the declared workforce in the building and construction sector in Algeria counts for 19.9% of the total active workforce in 2013 (ONS, 2013). But these figures should be taken with some reserve, they might be much higher, as undeclared workforce

(informal employment) is a widespread practice in this sector of activity (Mebarki, et al., 2015). According to the Algerian Office of Statistics (ONS, 2012, p.11), 3.9 million Algerians out of 9.7 million of the employed population are working in the informal, 37.4 % of them are in the building and construction industry. The aim of the present study is to investigate the effect of weight lifting during mortar's preparation tasks in bricklayer's assistants' job. Through the determination of lifting index (LI), and physical workload imposed by mortar preparation tasks. The data were collected from a sample of seventy-three (73) assistant-bricklayers, their demographic characteristics were as follows: average age of 35.8 ( $\pm$  9.2) years, mean weight of 72.7 ( $\pm$  4.3kg), mean height of 171.4 ( $\pm$  4.0cm), and a seniority in the profession ranging from 02 to 26 years With an average of 7.4 ( $\pm$  5.0 years). To assess the variables of the study the following tools were used: (1) direct observation, video recording, (2), the method of National Institute of Occupational Safety and Health (NIOSH) and the Ergo-Fellow software to assess the maximum permissible weight lift, beside (3) the scales of Borg RPE and CR10. Assessment of the physical workload of tasks showed that the steps involving the cement mortar preparation involved a physical load for the sample studied. The results of the assessment of the difficulty of work (The painfulness) by the Borg scales during the morning and evening work periods showed no statistically significant differences between the two work periods in the different regions of the body. However, maximal values were observed for all workers in the lower back during the two periods of the day, with a 50% equivalent effort, and 48.8% in the evening to the maximum voluntary force (FMV). The results of the NIOSH method gives a lifting value LI = 11.11, exceeding the value allowed for lifting by nearly 4 times. In order to alleviate occupational hazards and reduce physical workload imposed by improper task/job design, appropriate recommendations are put forward.

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# Ergonomics & Human Factors

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## ERGONOMIC DESIGN OF WORKSTATIONS: TURKEY READY-MADE CLOTHING SECTOR CASE

**Özlem Kaya**

Hitit University, Turkey

**T**he role of ergonomic design is crucial in raising living standards and optimizing conditions. In this respect, it should be taken into consideration that starting from the design stage of every kind of product, it is the person who takes part in or benefits from all processes up to the stage of production and use. Therefore, products and environment should be produced and designed according to human, machine and environment relationship. In order to achieve this harmony and relationship, human characteristics must be known. The harmony and alignment of the workplace and all its elements with the worker is only possible through correctly designed workstations. In this respect, by providing a good harmony between the worker and the work, it is possible to improve job efficiency by preventing the wear and tear of the human being from the difficulties while working. By providing the desired harmony between occupation and worker, it can be ensured that the workers are directed to tasks where the individuals can best use their abilities. For all these reasons, business organization is very important from an ergonomic point of view. It is not sufficient that a worker is placed within a human-machine production system only from a volume perspective. At the same time, the worker should be able to move easily in order to be able to carry out different tasks at work. In order for the mobile worker to be able to perform tasks with specific organs, there is a need for a certain functional volume. The controlling units of the machines used must also be included in this volume. The placement of machine controlling units within the volume around the worker, in other words positions, distances, force requirements and frequency of use should be determined by making use of the anthropometric characteristics of the

human being. The purpose of ergonomic workstation design is to ensure that workplace measurements conform to human body measurements. For this purpose, the suitability of the workstations of the companies in the ready-made clothing sector, which is one of the most important sectors of Turkey, in terms of ergonomic design, is very important. In this respect, the aim of this study is to evaluate the ergonomic design of the workstations in the ready-made clothing sector. In this study, workstations of 250 large-scale ready-made clothing companies under the Turkish Union of Chambers and Commodity Exchanges, which actively worked in 2017-2018, were examined and evaluated in terms of ergonomic design. As a result of the examinations, some solution proposals have been developed in terms of correct ergonomic design of workstations.

### Biography

Ozlem Kaya completed her degree in 2004 and her masters degree on the topic of the Analysis of Branding Level of Small Scale Firms in Leather Clothing Industry at University in 2008. She asserted her PhD thesis which was on the topic of the Effects of Supply, Production and Logistics Activities of Textile Clothing firms in Turkey on National Competition Dr. Kaya has been continuing her academic career at Hitit University since 2009. She acted as a subject expert for various commissions/universities and also as paper setter and evaluator of different institutes/universities. Dr. Kaya has a lot of articles which were published in national and international journal. She is the member of Association of Turkish Ergonomics.

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## THE PREVALENCE AND RISK EXPOSURE LEVELS OF WORK RELATED MUSCULOSKELETAL DISORDERS IN A CHINESE SHIPYARD

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and Zhongxu Wang<sup>1</sup>

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**W**ork-related musculoskeletal disorders (WMSDs) are major causes of disability in the workplace. It is unclear whether the exposure to risk factors and types of work play an important role in the occurrence of WMSDs. To determine the relationship between the prevalence of WMSDs and exposure level of risk factors among employees from different types of work, a cross-sectional study was performed among shipbuilding employees. 801 randomly selected shipbuilding workers from 6 major types of work with at least one year of work experience at a shipyard were studied. The prevalence and working condition data were collected using a self-designed ergonomics questionnaire modified based on Nordic musculoskeletal questionnaire (NMQ), and the exposure level was determined by standard quick exposure check (QEC) in Chinese version. WMSD positive cases were identified according to the definition employed by National Institute for Occupational Safety and Health (NIOSH). It was found that both WMSD prevalence and exposure levels at various body regions among shipbuilding workers were very high. This could be attributable to the awkward and prolonged bending postures adopted in the manufacturing processes. It was found that WMSD positive workers got higher QEC scores and identified as higher exposure levels compared with WMSD negative workers, and a weak correlation between WMSD prevalence and QEC score as well as that between WMSD prevalence and exposure levels were exist at back, shoulder/arm and wrist/hand. Both the prevalence of WMSDs and the exposure levels varied among workers of different type of works. In conclusion, there was a high WMSD prevalence and serious exposure risks at various body regions among shipbuilding workers. It seems that a higher exposure risk would lead to an increase

in the prevalence of WMSD slightly. And there were exposure distribution differences between workers from six major types of work in the same shipyard.

### Recent Publications

1. Qu Y et al. (2017) Multiwalled carbon nanotubes inhibit steroidogenesis by disrupting steroidogenic acute regulatory protein expression and redox status. *J. Nanosci. Nanotechnol.* 17:914-925.
2. Gonnissen D et al. (2016) Comparison of cellular effects of starch-coated SPIONs and poly(lactico-glycolic acid) matrix nanoparticles on human monocytes. *International Journal of Nanomedicine.* 11:5221-5236.
3. Borgognoni C F et al. Reaction of human macrophages on protein corona covered TiO<sub>2</sub> nanoparticles. *Nanomedicine.* 11(2):275-282.
4. Qu Y et al. (2011) full assessment of fate and physiological behavior of quantum dots utilizing *Caenorhabditis elegans* as a model organism. *Nano Lett.* 11(8):3174-3183.

### Biography

Ying Qu has completed her PhD from Chinese Academy of Sciences, P R China. She is a Research Associate Professor of National Institute of Occupational Health and Poison Control - Chinese Center for Disease Control and Prevention (China CDC). She has published more than 5 papers in reputed journals.

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Domhnall McGlacken Byrne et al., Arch Med 2018, Volume 10  
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## THE INFLUENCE OF GENDER ON PERFORMANCE OF COMMON CLINICAL PROCEDURES IN AN ACUTE IRISH HOSPITAL

Domhnall McGlacken Byrne<sup>1,2</sup>, Lucy Chapman<sup>1</sup> and Jack Tyrell<sup>2</sup>

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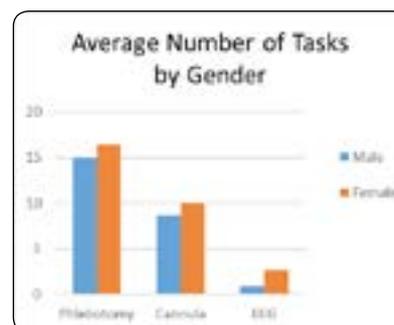
<sup>2</sup>Trinity College Dublin, Republic of Ireland

**Introduction:** Occupational-related gender differences have been explored. Differences have also been revealed in relation to workplace conflict and friendship patterns. Within healthcare, variations in the structure of and delivery of services has also been noted between male and female general practitioners. We undertook a study to evaluate the distribution of commonly performed medical tasks by gender amongst junior doctors in an Irish context.

**Methods:** Over a three-week period from September 25<sup>th</sup> to October 15<sup>th</sup> 2017, a prospective study was conducted amongst junior doctors in an acute Irish hospital. The number of phlebotomy and cannulation tasks as well as electrocardiograph (ECG) completion were gathered in a central database. Gender of performing doctor was collected concurrently. Ethical approval was obtained from Trinity College Dublin.

**Results:** Of the junior doctor sample (n=34), 19 were female and 15 were male. 537 phlebotomy tasks, 319 cannulation tasks and 66 ECGs were performed. 60% of tasks (n=552) were done by a female doctor. The average number of tasks performed by a doctor according to gender is depicted in Figure 1. Notably, female doctors were twice as likely as male doctors to complete an ECG. Analysis of diurnal task frequency by gender revealed that female doctors are almost twice as likely as male doctors to phlebotomize a patient when compared with their male counterparts (daytime phlebotomy task rate 7.0 versus 3.8 for females and males respectively). ECG completion by a female doctor was more than twice as likely during daytime shifts.

**Conclusions:** Female junior doctors appear to complete more medical tasks than their male colleagues. This was particularly found for the task of ECG completion. Human factors such as organizational attitudes to task distribution and approaches to task completion may be influenced by gender.



### Recent Publications

1. Davis M, Capobianco S and Kraus L (2010) Gender differences in responding to conflict in the workplace: evidence from a large sample of working adults. *Sex Roles*. 63(7-8):500-514.
2. Morrison R L (2008) Are women tending and befriending in the workplace? Gender differences in the relationship between workplace friendships and organizational outcomes. *Sex Roles*. 60(1-2):1-13.
3. Boerma W G, van den Brink Muinen A (2000) Gender-related differences in the organization and provision of services among general practitioners in Europe. *Medical Care*. 38(10):993-1002.

### Biography

Domhnall McGlacken Byrne graduated from Trinity College Dublin, Republic of Ireland in 2017. He is currently working at St. James's Hospital, Dublin. He wishes to pursue his medical career in the area of pediatrics.

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# DAY 2

Scientific Tracks & Abstracts



1<sup>st</sup> Edition of International Conference on

## Ergonomics & Human Factors

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# DAY 2

July 27, 2018

## Sessions

Occupational Health and Otolaryngology |  
Design of Tasks | Orthopaedics | Human Factors  
in Otolaryngology-Head And Neck Surgery |  
Biomechanics | Industrial Hygiene

### Session Chair

**Serpil Aytac**

University of Uludag, Turkey

### Session Co-Chair

**Jaehyun Park**

Incheon National University, Republic of Korea

### Session Introduction

**Title: Work postures, computer usage and musculoskeletal disorders among Algerian office workers**

**Argoub Mohammed**, Ibn Khaldoune University & University of Oran 2, Algeria

**Title: Postural evaluation in Agricultural workers**

**Zaki Manaoui**, University of Algiers 2, Algeria

**Title: The ergonomics of leadership: Developing the Leaders you've always dreamed of**

**Ernie Davis**, Powerhouse Motivations Coaching & Leadership Solutions, USA

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## WORK POSTURES, COMPUTER USAGE AND MUSCULOSKELETAL DISORDERS AMONG ALGERIAN OFFICE WORKERS

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The aim of the present study is to assess the impact of working postures in computer work stations on musculoskeletal disorders (WMSDs) among office workers in an Algerian tertiary sector. To investigate the relationship between working postures adopted by office workers and WMSDs, a sample of (20) male and female computer users participated in the study. The study was conducted into two steps: during the first step each participant was interviewed in order to determine the following parameters: (1) work time span to end work tasks, (2) rest poses, and (3) the preferred time to work on computer. While, the second step consisted of the application of the Rapid Upper Limb Assessment (RULA) method to evaluate different working postures adopted by members of the sample. A sample of 20 minutes of continuous observation was recorded with each participant. The results of the study revealed that: (1) working on the computer for a long time while maintaining inappropriate postures, contributed to the emergence of musculoskeletal disorders (neck, shoulders, low back pain), (2) office workers of the study are exposed to high WMSDs risk, which is due to inappropriate workstations layout that impose bending and twisting postures while working, as a result of incompatibility of office furniture and equipment with the anthropometric body dimensions of workers. This situation requires in-depth study, as well as, ergonomic intervention and improvement in the near future. A series of suggestions, are put forward, including the reorganization and layout of office equipment according to the ergonomic norms, taking into account a visual field of 15° to 30° angle.

### Recent Publications

1. Bouhafs mebarki et al. (2018) Burning and electrocution risk's evaluation and prevention procedures: a case study in a production work shop. In: advances in safety management and human factors. Springer international publishing. Isbn:978-3-319-60524-1.
2. Mohamed mokdad et al. (2017) Emotional responses of the disabled towards wheelchairs; in: advances in affective and pleasurable design. Page:86, wonjoon chung • cliff sungsoo shin (editors. Springer international publishing. Print isbn: 978-3-319-60494-7. Electronic isbn: 978-3-319-60495-4
3. Nelcy arevalo (2017) l'avenir de la formation d'ergonomes dans des contextes « arides » et « avides » d'ergonomie : enjeux d'une certification professionnelle internationale fiable. Actes, 52ème congrès de la société d'ergonomie de langue française, présent et futur de l'ergonomie : répondre aux défis actuels et être acteur des évolutions de demain. P. 113, Toulouse, 20 – 22 septembre 2017.

### Biography

Mohammed Argoub (Doctor, in Work design and Ergonomics, Oran 2 University, Algeria, 2017). He is member of Ergonomics and Prevention of Risks Laboratory at the University of Oran 2, Algeria, head of work psychology and Ergonomics speciality, University of Tiaret, Algeria, member of the Algerian Ergonomics society.

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## POSTURAL EVALUATION IN AGRICULTURAL WORKERS

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<sup>2</sup>El Oued University, Algeria

The agricultural sector continues to be an important component of Algerian National economy in terms of their contribution to GDP, and the number of work force. The Agricultural workers suffer from multiple risks in workplace including bad organizing of work. An ergonomics study was taken to evaluate professional farmers posture using OVACO method (Working Postural Analysis system), to determine different postures of work taken by agricultural workers in planting task, arranging and classifying in four categories depending by OWAS (Ovako Working Posture Analysis). The study randomly applied to the sample of 30 workers in three stages: the first stage were represented in the verification of existence of MSDs (Musculoskeletal Disorders) by using interview form (Nordic type questionnaire) of Kuorinka. The second stage was determined time of every task of farmer tasks. The third stage was applied OVACO method to evaluate the agricultural workers postures by photography. The results

suggest that there was three categories of postures: 1<sup>st</sup> Category: natural and acceptable postures having any effect on MSDs. 2<sup>nd</sup> Category: adjustable postures for damage at MSDs. 3<sup>rd</sup> Category: danger postures causing pains. The results indicate that the curved posture was more repetitive, which classify in second category in OWAS classification, this is due to bad organizing of job and the place of seed scuttle which demand to workers frequently bending. As expressed by the sample 95% take this position as they work.

### Biography

Zaki Manaoui completed his Postgraduation studies from University of Algiers 2, Algeria. He is currently pursuing Postdoctoral studies from the same university. He is a Member in Prevention and Ergonomics Laboratory, a teacher in El Oued University, Algeria.

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# Ergonomics & Human Factors

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## THE ERGONOMICS OF LEADERSHIP: DEVELOPING THE LEADERS YOU'VE ALWAYS DREAMED OF

### Ernie Davis

Powerhouse Motivations Coaching & Leadership Solutions, USA

**W**e must become and develop the leaders we've always dreamed of... In life you may only get one chance to lead. If you get it wrong, you may never get another chance, and your cause, or operation and organization will fail, and you will never have to worry about ergonomics, supervision, or leadership again. According to the U.S. Department of Labor's Bureau of Labor Statistics more than twenty million people willingly walk away from their jobs each year, in the United States. They don't stay around long enough to become victims of accidental safety mishaps or poorly planned operations. They quit. This is a major problem for industries and organizations around the world, and the smaller the operation the greater impact. The cost of acquiring and training one new hire can drastically cut into an organizations operating budget. It can force smaller organizations into obscurity and influence them to shutter their doors forever. It's a major problem and it's the result of poor and ineffective leadership. Poorly trained and ineffective leaders are a detriment to safe and efficient operations in the work place. They are cancer to your organization which must be addressed today, but what do you do? They are the reason why most of your healthy, ambitious, and motivated employees and team members quit each year. We can't simply fire all of the ineffective and poorly performing leaders in the world, but it's an emergency which must be addressed. In the US employers and organizations like yours

spend over \$11 Billion Dollars per year to simply addressing the symptoms of the problems; acquiring and training new hires. In this presentation you will discover valuable solutions that get at the root of the problem and learn practical ways to make your organization ergonomically efficient from the standpoint of a supervisor or leader on the front lines.

### Biography

Ernie Davis is the founder and co-owner of Powerhouse Motivations Coaching & Leadership Solutions, USA. He leads a highly talented team of professional coaches and trainers in helping ambitious individuals and organizations reach their maximum potential and profitability in diverse industries and organizations around the world. He is a member of the one of the world's preeminent leadership fraternities with roots in the United States Naval Construction Force and has educated, trained, and developed ergonomically responsible leaders in over 17 countries. He is an extraordinary life and leadership strategist, motivational teacher, author, and entrepreneur. His first self-help book, *Pave Your Way to Victory*, is expected to become a best seller following its release in 2019. Ernie enjoys intellectual conversation, physical fitness, family time, and inspiring others to greatness. He is an executive for several non-profit leadership organizations and has been recognized on social media as The People's Coach.

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# DAY 2

Young Research Forum



1<sup>st</sup> Edition of International Conference on

## Ergonomics & Human Factors

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M Corbett et al., Arch Med 2018, Volume 10  
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## IDENTIFYING AND REDUCING RISKS IN FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS) THROUGH A HIERARCHICAL TASK ANALYSIS (HTA)

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**Introduction:** Functional endoscopic sinus surgery (FESS) is a common surgical procedure performed in all major ENT centres. Understanding the mechanisms behind human errors in FESS has potential to reduce the adverse events and improve the risks associated with undergoing FESS.

**Aim:** The aim of the study is to develop a hierarchical task listing of steps required to perform Functional endoscopic sinus surgery (FESS). To complete a technical and human factor analysis of tasks resulting in the identification of errors, frequency, severity, and reduction through remediation.

**Methods:** A triangulation of methods was used in order to derive the steps required to complete a FESS: (1) a literature review was conducted on published descriptions of FESS techniques; (2) observations of three FESS; (3) interviews with 5 surgeons on FESS techniques. Data sets were combined to develop a task analysis of a correct approach to conducting FESS. A review by 12 surgeons, and observation of 20 FESS resulted in refinement of the task analysis. With input from 5 consultant surgeons and 2 consultant anaesthetists, a Systematic Human Error Reduction

and Prediction Approach (SHERPA) was used to identify the risks and mitigating steps in FESS.

**Conclusions:** Hierarchical Task Analysis and SHERPA are valuable tools to deconstruct performance and to highlight potential errors in FESS. The HTA and SHERPA approaches are useful learning and assessment tools for novice surgeons. The information offers the opportunity to improve surgical training and enhance patient safety.

### Biography

Mel Corbett obtained his primary degree in NUI Galway School of Medicine in Republic of Ireland in 2017. He is currently pursuing MSc in Health Informatics from the University of Limerick, while concurrently completing his intern year in University Hospital Limerick, Republic of Ireland. He will be commencing the Royal College of Surgeons Ireland Core Surgical Training scheme in July 2018. His research interests include: quality improvement in healthcare, sinus surgery and human factors in surgery. He has presented nationally at the Irish Otolaryngology Society Conference and the Royal Academy of Medicine in Ireland Section of Interns Study Day.

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## ERGONOMIC RISK FACTORS FOR PAIN AND DISABILITY AMONG WAITERS

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**T**he restaurant market in Israel is large, accounting for 2.4% of the total revenue of the economy. The organization of work in restaurants is determined according to the management criteria. Risk factors include food preparation, serving, cleaning, mental and physical factors resulting in work-related musculoskeletal disorders (WRMSDs). It was found that the prevalence of pain at the end of waiters' working day was 55% in the upper back, 50% in the lower back, and 45% in the neck. We aim to investigate this population in Israel, to assess the prevalence of WRMSDs among waiters, and to evaluate the association between work hazards and WRMSDs. An observational cross-sectional study including one hundred waiters from three restaurants aged 18-60 working full-time, at least two years. Excluding criteria will be serious accidents and spinal and skeletal surgeries, with pain lasting longer than three months. Participants will fill out seven questionnaires: basic demographics and working conditions; occupational-medical-historical questionnaire, the neck disability index (NDI); quick disabilities of the arms, shoulders and hands (DASH); the modified Oswestry low back pain disability questionnaire (MOQ), a psychosocial questionnaire containing estimation workload (WL), burnout (BMQ), job satisfaction (JAQ), and task frequency questionnaire. Ten waiters randomly chosen will be observed while working during one rush hour, using the rapid entire body assessment (REBA) worksheet. Between 3-6

most dangerous postures for each waiter, will be taken to fill the REBA worksheet for each posture which will be scored and evaluated as a risk factor for pain and disability. Further, the weight of dishes and food carried by the ten waiters will be examined by weighing the waiters with the dishes, and their steps will be counted by using an application in their mobiles.

### Biography

Zuha Tarabeih has completed her BA in Nursing from Tel Aviv University, Israel. She is pursuing her Master's Degree in Occupational Health focusing on Ergonomics specialization, and works as an Assistant in Nursing Department at the same university. She is a Nurse in a reputable emergency medicine center which demands quick thinking and decisive action to provide care and monitor health conditions, besides to working in a national call center of its kind, for the treatment of a range of chronic conditions, in coordination with the client's primary physician and other community-based resources. She also volunteers in an Arab feminist movement that struggles against oppression in all its forms and shapes, which provides psychological support and legal advice to women subjected to sexual violence, to raise awareness among school students on the issue of sexual assaults, and gender issues.

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## TRANSFER OF TASKS: THE IMPACT OF HUMAN FACTORS ON MEDICAL TASK REALLOCATION

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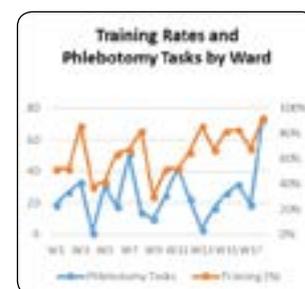
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**Introduction:** The Transfer of Tasks (ToFT) initiative, an industrial relations agreement, involves the transfer of phlebotomy and cannulation tasks from non-consultant hospital doctors (NCHDs) to nurses in acute Irish hospitals. It aims to facilitate timely, effective patient interventions. This national strategy was first enacted in 2016. St. James's Hospital, Dublin instigated the process in May 2017 with a local implementation team delivering standardized training. We conducted a study to determine the impact of nurse training on NCHD task workload.

**Methods:** A prospective study gathered data on the number of phlebotomy and cannulation tasks per hospital ward performed by NCHDs over a three-week period from March 5<sup>th</sup> to March 25<sup>th</sup> 2018. Average times per task were obtained using observational methods. Point prevalence analysis of nurse training rates was performed at the end of data collection. Indices related to ward-based nursing work demands were obtained concurrently. Wards not involved in the ToFT initiative were excluded.

**Results:** Eighteen wards were included in the study. 464 phlebotomy and 326 cannulation tasks were performed by NCHDs (n=42) over a three-week period. Average times per task were 10 minutes and 15 seconds (SD 5 minutes and 51 seconds) per phlebotomy task and 11 minutes and 8 seconds (SD 3 minutes and 11 seconds) per cannulation task respectively. Nursing training rates did not consistently correlate with number of tasks performed by NCHDs. Reduced ward-based nursing work demands were not significantly associated with a reduction in tasks performed by NCHDs.

**Conclusions:** In spite of intensive training, organizational management oversight and a standardized national initiative, nursing training rates are not consistently inversely correlated with the number of tasks performed by NCHDs. Human factors like interpersonal relationships, attitudes towards task reallocation and job-design factors may impact upon the implementation of ToFT.



### Recent Publications

1. Transfer of Tasks from NCHDs to Nurses [Internet]. www.imo.ie. 2016 [cited 24 April 2018]. Available from: <https://www.imo.ie/news-media/news-press-releases/2016/transfer-of-tasks-from-nc/>
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3. Faller E et al. (2016) Immune thrombocytopenia purpura associated with multiple myeloma. *Annals of Hematology*. 95(8):1371-1372.

### Biography

Lucy Chapman was elected a Scholar in Medicine of Trinity College Dublin, Republic of Ireland in 2010 and subsequently graduated in 2013 in the 93<sup>rd</sup> centile. She is pursuing a Masters in Health Informatics in Medicine of Trinity College and has a keen interest in quality improvement in healthcare. Currently, she is a Physician Lead on the implementation of an electronic medical record at St. James's Hospital and is pursuing future specialist medical training in the area of geriatric medicine.

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## PREVALENCE OF MUSCULOSKELETAL STRAIN IN OFFICE WORKERS ASSOCIATION WITH WORKING ABILITY AND ERGONOMICS

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**M**usculoskeletal strain (MSS) is one of the mayor health problems in office workers (OW), while in EU these affecting millions of workers and cost companies a billion euros every year. Working long time in sitting position in unergonomic work postures causes MSS and working ability loss. The aim of the present study is to evaluate musculoskeletal strain in office workers association with working ability, and ergonomic workplace environment conditions. All participants worked in Estonian Government Buildings whole workday with computer in sitting position. Participants filled modified Nordic questionnaire, which evaluates MSS in last 30 days in eight different body regions. Work ability was assessed by standardized questionnaire (Finnish Institute of Occupational Health), where calculated work ability index (WAI). Results showed that MSS in last 30 days was localized primarily in low back (69%), in neck (67%), in shoulders (56%), and in upper back (51%). Women perceived more MSS in upper back ( $p=0.032$ ), in shoulders ( $p=0.027$ ), and in neck ( $0.002$ ) compared with men. OW-s average work ability according to WAI was "good" (result $\pm$ SD: 38 $\pm$ 5). Lowest work ability index was noted in age group 40-49 a (1%). OW-s, who weren't satisfied with their workplace ergonomics, perceived more MSS ( $p<0.05$ ) (in wrist, in upper back, in shoulders, and in low back In conclusion office workers in Estonia perceived more musculoskeletal strain in low back, in neck, in shoulder, in upper back, and in wrist. Unergonomic workplace causes often MSS in OW. Work ability loss is noted in individual office workers, starting at the age of 40. To avoid and prevent musculoskeletal strain it is obligatory to evaluate workplace ergonomics, use ergonomic equipment, and take rest breaks during workday.

### Recent Publications

1. Sirge Triinu, Ereline Jaan, Kums Tatjana, Gapeyeva Helena, Pääsuke Mati (2017). Motor function characteristics in supermarket cashiers with and without low back pain. NES Joy at Work. Ed. Anna-Lisa Osvalder, Mikael Blomé and Hajnalka Bodnar (Eds.). Lund University: Lund University, 148.

2. Sirge Triinu (2017) Our bodies are designed to move. *Personnel Praktik*. 64:36-37.
3. Sirge Triinu (2016) et al. Prevalence and localization of musculoskeletal strain in female office workers. *Publications of the University Eastern Finland. Report and Studies in Health Sciences* 22. 2016, 276 p., 160-163.
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5. Sirge T (2014) Musculoskeletal symptoms, and perceived fatigue and work characteristics in supermarket cashiers. *Agronomy Research*. 12(3):915-924.

### Biography

T Sirge has completed (2010) her studies in Estonian University of Life Sciences, the only place in Estonia, where you can study ergonomics. She is currently completing her Doctoral studies at University of Tartu, in movement and sport sciences. She is an active Member in ErgoEst (Ergonomics Association in Estonia), Founder of Ergoway OÜ (leading occupational health, safety, and ergonomics company). She has published many articles about ergonomics, musculoskeletal discomfort and occupational health.

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## SOME EFFECTS OF HVAC SYSTEM IN SPECIFIC WORKING ENVIRONMENT - A CASE STUDY

**Jovana Stevanovic**

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**M**ost of the work people perform in closed rooms. However, proper attention previously has not been directed to the problem of people working in offices without natural ventilation. The subject of this study is the influence of the HVAC system on health, working ability, absenteeism and the satisfaction of people working in an office without natural ventilation. There is no known ergonomic research that previously dealt with this topic, taking into account the above-mentioned specificity. A case study was conducted, which included fifteen employees of a branch of a company engaged in the provision of telecommunication services. Employees in the branch office of this company perform tasks in several rooms where no natural ventilation is applied. In view of this, special attention is paid to the practice of maintaining the HVAC system. An original questionnaire specially formulated for this purpose was used, which was answered by the staff of the company that maintains the HVAC system for the mentioned company. In addition, an adapted general health questionnaire was used, which also included issues related to the impact of the work environment on working ability and the satisfaction with the existing air quality. The results of the conducted research show what are the most pronounced health problems of the workers. It is concluded that in order to maintain the health of workers in offices without natural ventilation, a comprehensive approach is required, which involves more strict air control that involves

additional measurement of certain parameters of the air quality in regular intervals, as well as additional education of staff of firms who maintain HVAC systems.

### Biography

Jovana Stevanovic is a graduated manager. She finished studies at Faculty of organized sciences in Belgrade. During the studies, she started to volunteer thanks to Faculty which organized several summer practices (Department of the Institute for children's summer camp, Bancalntesa, a private firm, called KBC-net, etc). After studies, she decided to try herself in NGO sector. She was a Leader of Event Team in ESN Belgrade organization, a non-profit international student organization, which mission is to represent international students in Belgrade. Also, she was a part of the organizing team of the School of Skill in section HR and Marketing. The project is designed so that students of Belgrade University, various colleges, provide knowledge of the skills that are needed during and after the study, and the relationships between people, incentives for progress and the ethics that should be kept on the job. There she was a team leader of FR (Finance Resources) Team. In the end she enrolled at the Faculty of Mechanical Engineering, the direction: industrial engineering where on the subject Ergonomics, she exploring the influence of the working environment on the productivity of employees

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