BUTEKOM
Bursa Tekstil & Konfeksiyon AR-GE Merkezi

UİB

THE FIBER SOCIETY

Advancing Scientific Knowledge
Pertaining to Fibers and Fibrous Materials

The Fiber Society Spring 2010 International Conference

May 12—14, 2010

hosted by

UIB – Uludağ Exporters Union

and

BUTEKOM—Bursa Textile & Confection Research Center

Dr. Yusuf Ulcay, Conference Chair

Venue

Merinos Congress Center
Bursa, Turkey

PROGRAM

Tuesday, May 11

1:30 PM–5:00 PM	Governing Council Meeting
5:30 PM–8:00 PM	Early Bird Registration
5:30 PM–8:00 PM	Early Bird Reception

Wednesday, May 12

7:30 Registration and Breakfast
8:30 Welcoming Remarks, Business & Announcements *Yusuf Ulcay, Chair*
Dominique Adolphe, President, Fiber Society
İbrahim Burkay, President of UTİB
9:00 Plenary Talk (in Orhangazi Salon): Dr. Behnam Pourdeyhimi, North Carolina State University, U.S.A.: *Nonwovens as Potential Shelter Materials*
9:45 Break

Morning Session

	Session 1A: Nano Applications ***Chair: Fatma Göktepe*** ***Room: Seminar 3***	**Session 1B: Dyeing & Finishing** ***Chair: Kevser Korhan-Taymaz*** ***Room: Seminar 4***
10:00	*Metal or Metal Oxides Coated Nanofibrous Web with Exceptional IR and UV Extinction at High Permeability* Jintu Fan, Pingtang Zhao, and Huijun Wu, Hong Kong Polytechnic University	*Improved N-Halamine Antimicrobial Coatings* Hasan B. Kocer, Roy M. Broughton, S.D. Worley, Auburn University
10:20	*Nanoclay and Compatibilizer Effects on Polypropylene Cast Film Processing and Properties* Sabit Adanur and Ikilem Gocek, Auburn University	*Poly(ethylene Terephthalate) Antistatic Treatment* Stephen Michielsen and Samuel B. Watson, North Carolina State University
10:40	*Direct Electrospinning of Highly Twisted, Continuous Nanofiber Yarns* Tong Lin, Usman Ali, Yaqiong Zhou, and Xungai Wang, Deakin University	*Antibacterial Functionalizations of Textile Fabrics Through Low-cost Wet Chemistry Methods* Mouna Messaoud and Michel Langlet, LMGP

11:00	***Break***

11:20	*Use of Nanospinning Facilities to Produce Tubular Guides for Peripheral Nerve Repair* Laurence Schacher[1], Nabyl Khenoussi[1], Dominique C. Adolphe[1], Didier Gigmes[2], Thomas Trimaille[2], and Denis Bertin[2], [1]CNRS/UHA, [2]UMR CNRS	*The Application of Nano-oxides in the Antiwrinkle Finishing of Cotton Fabric* Tianhong He, Jinbo Yao, and Haiyang Zhao, Tianjin Polytechnic University
11:40	*Pointed Surface Modification of Fibrous Structure for Development of Fiber-based Microfluidic Devices* Fehime Vatansever[1], Ruslan Burtovyy[1], Taras Andrukh[1], Sergiy Minko[2], Konstantin Kornev[1], and Igor Luzinov[1], [1]Clemson University, [2]Clarkson University	*The Effect of Chemical Structure and Particle Size of Crease Recovery Agents on the Electrical Conductivity of Treated Woven Fabrics* Cem Güneşoğlu, Sinem Güneşoğlu, and Bilgen Çeliktürk, Gaziantep University
12:00	*Production of PAN and PVA Nanofibers Incorporated PMMA/n-Hexadecane Nanocapsules for Thermal Comfort in Textiles* Sennur Alay[1], Cemil Alkan[2], and Fethiye Göde[1], [1]Süleyman Demirel University, [2]Gaziosmanpaşa	*Performance Evaluation of Ultrasonic Assisted Reactive Dyeing of Cotton Under Multiple Variables* Nisar Ahmad Jamil, Babar Shahbaz, Muhammad Tayyab Nouman, University of Agriculture

12:20–1:45	***Lunch at the Göl Café Restaurant***

Afternoon Session

1:45 Plenary Talk (Orhangazi Salon): Dr. Roy M. Broughton, Auburn University, U.S.A.
New Directions in Braiding

	Session 2A: Nano Applications ***Chair: Behnam Pourdeyhimi*** ***Room: Seminar 3***	**Session 2B: Dyeing & Finishing** ***Chair: Abdülkadir Bilişik*** ***Room: Seminar 4***	**Session 2C: Fabric Properties** ***Chair: Recep Eren*** ***Room: Seminar 5***
2:20	*The Effect of Material and Thickness of Collector Electrode on Fiber Fineness in Electrospinning* F. Göktepe[1], G. Şimşek[2], Ö. Göktepe[1], and S. Çömlekçi[3], [1]Namik Kemal University, [2]Pamukkale University, [3]Suleyman Demirel University	*The Antimicrobial Efficiency of Polyamide 6/Silver Nanocomposites* Aysin Dural Erem[1], Mikael Skrifvars[2], Uğur Demirpek[3], and Gülay Özcan[1], [1]Istanbul Technical University, [2]University of Borås, [3]GATA	*The Thermal Properties of Alpaca and Alpaca/Wool Blended Fabrics* Umut Bilen[1] and Erhan Kirtay[2], [1]Namik Kemal University, [2]Ege University
2:40	*Structural Design of Electrospun Nanofibers* Maryam Yousefzadeh[1,2], Mohammad Amani[1], Masoud Latifi[1], Wee-Eong Teo[3], and Seeram Ramakrishna[3], [1]Amirkabir University of Technology, [2]Iranian National Elite Foundation, [3]National University of Singapore	*A Study of Antimicrobial Property of Textiles Using Dendrimers as a Vehicle for Antimicrobial Agents* Subhas Ghosh[1] and Nadarajah Vasanthan[2], [1]Eastern Michigan University, [2]Long Island University	*Fabric Formability in Multilayer Woven Fabrics* A. Alamdar-Yazdi, J. Dastjerdi, and M. Fotohi, University of Yazd
3:00	*Electrospun Functional Nanofibers* Tamer Uyar, Fatma Kayaci, Asli Celebioglu, and Ali Ekrem Deniz, Bilkent University	*Investigating the Effect of Silver Doped Bio-antibacterial Finishing Agent on the Properties of Knitted Fabrics* Mustafa E. Üreyen, Aydin Dogan, and A. Savaş Koparal, Anadolu University	*Body Modification for Enhanced Sport Performance* G. Montagna[1], H. Carvalho[2,3], A. Catarino[2,] , M. Dias[2], and S. Rocha[2], [1]Technical University of Lisbon, [2]University of Minho
3:20	*Treatment of Sepiolite for Improving Polyuretane Nanocomposite Electrospun Fibers* Birgül Benli[1], Rastam Hojiyev[2], Tuncay Gümüş[2], Yusuf Ulcay[2], Ali Demir[1], and Mehmet S. Çelik[1], [1]Istanbul Technical University, [2]Uludağ University	*Application of Chitosan on Textiles* Usha Sayed and Sanjay Kumar Bandopadhyay, Institute of Chemical Technology	*Nonlinear 3D Modeling of Fibrous Assemblies by Their Tensil, Shear and Bending Properties* G.K. Stylios and L. Luo, Heriot Watt University

3:40	***Break***

	Session 3A: Nano Applications ***Chair: Gajanan Bhat*** ***Room: Seminar 3***	**Session 3B: Dyeing & Finishing** ***Chair: Stephen Michielsen*** ***Room: Seminar 4***	**Session 3C: Fabric Properties** ***Chair: George K. Stylios*** ***Room: Seminar 5***
4:00	*Nanocomposite Fibers with Cellulose Nanocrystals and Carbon Nanotubes* You-Lo Hsieh and Ping Lu, University of California at Davis	*Dyeing of Polyamide Fabrics with a Natural Dye: White Onion Skin* Riza Atav and Osman Namirti, Namik Kemal University	*Thermal Comfort Properties of Knitted Fabrics Made of Elastane and Bioactive Yarns* Elena Onofrei, Ana Maria Rocha, and André Catarino, University of Minho
4:20	*Carbon Nanotube/Epoxy Nanocomposites* Cihan Uzunpinar[1], Maria L. Auad[1], Mirna A. Mosiewickib[2], and Robert J.J. Williams[2], [1]Auburn University, [2]University of Mar del Plata and National Research Council	*Dyeing of Sericin-modified Cotton with Reactive Dye in Absence of Salt* D. Das, S. Bakshi, and D.B. Datta, National Institute of Fashion Technology	*A Study on Moisture-related Properties of Wool/Acrylic Blend Fabrics* M. Küçükali, B. Uygen Nergis, and C. Candan, Istanbul Technical University
4:40	*Development of Nanoclay as Reinforcement for Polyester Fibers* Rustam Hojiyev[1], William Carty[2], and Yusuf Ulcay[1], [1]University of Uludağ, [2]Alfred University	*Natural Dyeing of Cationized Cotton* Mustafa Tutak and Hüseyin Benli, Erciyes University	*Thermoelectric Cooling Garment by Peltier Device* Yelee Jung, Ara Cho, Jiyeon Lee, and Eunae Kim, Yonsei University
5:00	*Challenging Issues for the Use of Nanoparticle Additives in Polyester Fiber Spinning* Mutlu Sezen, Korteks	*Green Processing—Foam Dyeing for Developing the Washout Effect on Cotton Knitted Fabric* Songmin Shang, Enling Hu, Shanshan Tsoi, Chi Wai Kan, and Shou-Xiang Jiang, Hong Kong Polytechnic University	*A Study on the Effect of Microwaves on the Shrinkage of Weft Knitted Fabrics* S.A. Mirjalili, University of Yazd

Evening Session

5:40	***Reception at KORTEKS***
6:00	***Visit of KORTEKS Facilities*** (www.korteks.com.tr)
7:00	***Dinner at KORTEKS, Sponsored by KORTEKS***
8:00	***Evening Talk, Mr. Nejat Altin, General Director of KORTEKS***
8:30-10:30	***City Tour by Bus*** • ***Whirling Dervishes Ceremony at Karabas-i Veli Culture Center*** • ***Tea & Coffee Break at Hunkar Kosk (Mansion) Followed by Return to Hotels***

Thursday, May 13

7:30 Registration and Breakfast
8:00 Plenary Talk (in Orhangazi Salon): Dr. Moon Suh, North Carolina State University, USA
Assessment of Modeling for 100 Years—Good Models, Bad Models, and Wrong Models

Morning Session

	Session 4A: Nano Applications ***Chair: Rudolf Hufenus*** ***Room: Seminar 3***	**Session 4B: Dyeing & Finishing** ***Chair: Ian Hardin*** ***Room: Seminar 4***
9:00	*Electrospun Nanofiber Waterproof Breathable Membranes* Ali Demir, Emre Kiyak Yasar, and Tuncay Gumus, Istanbul Technical University	*Influence of Different Bleach Activators in Hydrogen Peroxide Bleaching of Pure Cotton Fabric* M. Iftikhar and H.M. Asif, University of Agriculture
9:20	*A New Look on Nanofibrous Nonwovens* Karen De Clerck, Sander De Vrieze, Bert De Schoenmaker, Lien Van Der Schueren, Ghent University	*Bleaching of Polyamide Fibres with Sodium Borohydride* Duygu Yilmazer and Mehmet Kanik, Uludağ University
9:40	*Interactive Effects of Synthesis Parameters on the Reaction of β-Cyclodextrin Nanocapsule with Itaconic Acid* Malihe Nazi[1], Reza Mohammad Ali Malek[1], Mohammad Bamani Moghaddam[2], [1]Amirkabir University of Technology, [2]Allameh Tabataba'i University	*The Effects of Ozone Treatment on Polylactic Acid (PLA) Fibers* Mike Wilding[3], Hüseyin Aksel Eren[1], Osman Ozan Avinç[2], and Pinar Uysal[1], [1]University of Uludağ, [2]University of Pamukkale, [3]University of Manchester
10:00	*Spontaneous ZnO Nanoparticulation on the Surface of ZnO Nanofibers via Sol-Gel Electrospinning* Yakup Aykut, Behman Pourdeyhimi, and Saad A. Khan, North Carolina State University	*Effects of Different Finishing Processes on Breaking Strength of Denim Fabrics* Sibel Kaplan[2] and Vildan Sular[1], [1]Dokuz Eylul University, [2]Suleyman Demirel University

10:20	***Break***

	Session 5A: Nano Applications ***Chair: Roy Broughton*** ***Room: Seminar 3***	**Session 5B: Fabric Properties** ***Chair: Mike Wilding*** ***Room: Seminar 4***
10:40	*Electrospun Magnetic Polymer Nanocomposite Fibers* Cem Güneşoğlu[1], Zhanhu Guo[1], Suying Wei[1], Jiahua Zhu[1], Xuelong Chen[1], and David P. Young[2], [1]Lamar University, [2]Louisiana State University	*Evaluation of Abrasion Properties of Mattress Ticking from Knitted Spacer Fabrics* Levent Onal[1] and Mustafa Yildirim[2], [1]Erciyes University, [2]Boyteks A.Ş.
11:00	*Electrospun Nanofibrous Structures with Live Yeast Cells* M. Fatih Canbolat, Nimish Gera, Behnam Pourdeyhimi, Balaji Rao, and Saad Khan, North Carolina State University	*Evaluation of Protective Clothing Materials Composition Property Relationship* Kevser Korhan-Taymaz and Tolga Saatioglu, Department of National Defence
11:20	*Air Filtration by PVA Nanofibers* Yüksel İkiz, Pamukkale University	*Ballistic Performance of Multiaxis Noninterlaced/Non-Z E-glass/Polyester Composites with Soft Backing Aramid Fabric Structures* Kadir Bilisik, Erciyes University

11:40	*Effect of Voltage and Tip-collector Distance on Electrospun Polyacrylonitrile (PAN) Nanofibers* Ümran Özkoç, Halil İbrahim İçoğlu, and Ali Kireçci, University of Gaziantep	*Polymeric Optical Fiber Fabrics for Illumination and Sensorical Applications in Textiles* Lukas J. Scherer, Evren Aslan Gürel, Markus Rothmaier, Rudolf Hufenus, and René Rossi, Empa

12:00–1:15	***Lunch at the Göl Café Restaurant*** **POSTER SETUP**

Afternoon Session

1:15 Plenary Talk (in Orhangazi Salon): Dr. Ali Demir, İstanbul Technical University, Turkey
Fiber Research in Turkey.

	Session 6A: Fibers ***Chair: Karen De Clerck*** ***Room: Seminar 3***	**Session 6B: Yarn Spinning** ***Chair: Dominique Adolphe*** ***Room: Seminar 4***	**Session 6C: Test Methods** ***Chair: Osman Babaarslan*** ***Room: Seminar***
1:45	*Small Scale Tests for Characterization of Bioengineered Cotton Fibers* Özgür Ceylan, Lieve Van Landuyt, and Karen De Clerck, Ghent University	*A Comparison of Yarn Properties Produced on Different Ring Spinning Methods* Hüseyin Gazi Ortlek and Gamze Kiliç, Erciyes University	*Fiber Quality Control Using Real-time Dyebath Monitoring* Melih Gunay[1], Matt Farrell[1], William Dixon[1], and Warren Jasper[2], [1]HueMetrix Inc., [2]North Carolina State University
2:05	*Theoretical and Experimental Contributions Regarding the Main Characteristics of the Angora Mohair Fibers from Goats Acclimatized in Romania* Carmen Ghituleasa, Emilia Visileanu, and Constantin Aurel, National Research and Development Institute for Textiles and Leather	*Investigation on Production and Properties of Core-spun Yarns Containing Nylon 66 Nanofiber Yarn as Core Part* Behrang Adeli, Zahra Tadi, Mohsen Shanbeh, and Sedigheh Borhani, Isfahan University of Technology	*Evaluation of Fabric Defects in a Weaving Mill* H. Ziya Özek, Namik Kemal University
2:25	*Sound Barrier Properties of PLA-Hemp Nonwoven Composites* *Nazire Deniz Yilmaz[1], Nancy B. Powell[2], and Pamela Banks-Lee[2], [1]Pamukkale University, [2]North Carolina State University*	*Assessing and Predicting the Tensile Strength of Polyester/Viscose Blended Open-end Rotor Spun Yarns* Oğuz Demiryurek[1] and Erdem Koç[2], [1]Erciyes University, [2]Ondokuz Mayis University	*Shell Buckling Behavior of Fused Shirt Fabric Composite Under Cyclic Loading* Saeed Shaikhzadeh Najar, Behnam Namiranian, and Hamid Reza Mehralian, Amirkabir University of Technology

2:45	***Break***

3:00	*An Experimental Investigation on Some Physical Properties of Socks from Some New Regenerated Fibers* S. Cimilli Duru, B. Uygun Nergis, and C. Candan, Instanbul Technical University	*Identifying the Most Important Aspect in Spining Triangle Dimensions Controlling* A. Badehnoush and A. Alamdar-Yazdi, University of Yazd	*Estimation of Dissolution State of Various Polymers (PVDE, PVC, and PAN) from a Sonochemical Point of View* Masatomo Minagawa[1], Ken-ichi Agatsuma[1], Yoshiomi Shimo[1], Nobuhiro Sato[2], and Tomochika Matsuyama[2], [1]Yamagata University, [2]Kyoto University
3:20	*The Potential Effect of Rain Drops on Piezoelectric Voltage Output* D. Vatansever and E. Siores, University of Bolton	*Effect of Compact-Jet Spinning System on Yar Hairiness* Demet Yilmaz[1], Mustafa Reşit Usal[1], and Sayed Ibrahim[2], [1]Suleyman Demirel University, [2]Technical University of Liberec	*A Comparative Study on Degreation Occuredy by Applying Hair Colorant on Wool and Human Hair* M. Sharzehee, N. Rahimi-Rad, and A. Alamdar-Yazdi, University of Yazd
3:40	*Bicomponent Artificial Turf Fibers for Future Sports Flooring* Rudolf Hufenus[1], Christian Affolter[1], Martin Camenzind[1], Marcel Halbeisen[1], Adriaan Spierings[2], Andreas Tischhauser[3], Kaspar Zogg[4], and Gerhard Schramm[5], [1]Empa, [2]Inspire AG, [3]TISCA, [4]TIARA, [5]Schramm GmbH & Co.	*Influence of Contaminated Cotton on Yarn Manufacturing* Noorullah Soomro[1,2] and Iftikhar Ali Sahito[1], [1]Mehran University of Engineering and Technology, [2]Çukurova University	*Development of Disposable Hydrophilic and Antibacterial Polypropylene Nonwoven Sheet* Hakan Ünal, Gulay Özcan, and Saliha Bellisoy, Istanbul Technical University
4:00–4:45	**Poster Session** ***Chair: Yusuf Ulcay*** *Posters will be evaluated by a commission and the best poster will be announced at the banquet.*		

Evening Session

4:45	***Visit of TUBİTAK—BUTAL Facilities*** (www.butal.tubitak.gov.tr)
5:00	***Janissary band of musicians performs; local folk show***
6:00	***Visit of City Museum***
7:30	***Banquet at the Yildirim Beyazit Room, Merinos Congress Center*** ***Guest Speaker: Affan Ener, Director, Technical Textiles Division of Akin Tekstil***
10:30	***Entertainment by Firat Neziroğlu Show***

Friday, May 14

7:30 Registration and Breakfast
8:00 Plenary Talk (in Orhangazi Salon): Dr. Lubos Hes, The Technical University of Liberec, Czech Republic: *The Effect of Finishing Treatment on Thermal Comfort Properties of Wet Fabrics*

	Session 7A: Melt Spinning Textile & Environment ***Chair: Tamer Uyar*** ***Room: Seminar 3***	**Session 7B: Test Methods** ***Chair: Aliasghar Alamdar-Yazdi*** ***Room: Seminar 4***	**Session 7C: Fibers** ***Chair: Lubos Hes*** ***Room: Seminar 5***
8:40	*An Investigation on the Effect of the Intrinsic Viscosity on the Structural Properties of Poly(ethylene terephthalate) Fibers* M. Youssefi and M. Morshed, Isfanhan University of Technology	*Determination of Aramid Types by Analytical Methods* Kenan Yildirim[1], A. Melek Köstem[1], Uğur Özçağatay[1], Nurcan Aydin[2], and Şeref Güçer[1,2], [1]Tübitak, [2]Uludağ University	*Flame Retardant PLA from Phosphoramidates* Sabyasachi Gaan, Marina Turalija, and Laurie Mauclaire Schoenholzer, Empa
9:00	*Improvement in Tensile Properties and Morphological Changes on Draw-annealing of Melt Spun PPS Fibers* Gajanan S. Bhat and Prabhakar V. Gulgunje, University of Tennessee at Knoxville	*Production of Cotton Yarn Properties from Fiber Propertise Using Robust Regression* Hoseini Ravandi and S.M. Taheri, Isfahan University	*Antibacterial Waterborne Polyurethanes* Buket Demir, Roy Broughton, Leonardo De La Fuente, Jennifer Parker, and Maria L Auad, Auburn University
9:20	*Modeling Melt Spinning of Poly(ethylene terapthalate) Fibers* Şengül Teke[1], Şule Altun[1], Mehmet Teke[2], and Yusuf Ulcay[1], Uludağ University, FIGES Engineering	*An Analysis of Friction Coefficient on Nonwoven Fabrics by Using Two Different Methods* Nazan Avcioğlu Kalebek and Osman Babaarslan, Çukurova University	*A Study About Photovoltaic Fibers* Ayse Bedeloglu[1], Ali Demir[2], and Yalcin Bozhurt[1], [1]Dokuz Eylul University, [2]Istanbul Technical University
9:40	*The Effect of High-energy Electron Beam on High-density Polyethylene Fibers* Farshad Sharbafian[1], Jalil Morshedian[2], and Yousef Jahani[2], [1]Islamic Azad University, [2]Iran Polymer and Petrochemical Institute	*Mechanical Properties of Woven Reinforcement Fabric on Nonwoven Filters* Mehmet Ermin Yuksekkaya, Mevlut Tercan, and Gamze Ozbag, Usak University	*Study on the Kinetics and Colouristic Properties of Polypropylene/Poly(butylene terephthalate)/Nanocaly Blend Nanocomposite Fibers* A. Bigdeli[1], H. Nazockdast[2], A.S. Rashidi[1], M.E. Yazdanshenas[3], [1]Islamic Azad University, [2]Amirkabir University of Technology, [3]Islamic Azad University

10:00	***Break***

	Session 7A: Melt Spinning *continued*
10:20	*Green Textiles, Sustainability, and the United States Market* Ian Hardin, University of Georgia
10:40	*Recycling of Wool and Feather Wastes: Evaluation of Enzymatic Treatment* F. Dadashian, N. Hemmatinejad, H. Atri, and N. Talaei, Amirkabir University of Technology

11:00–11:30	**Closing Remarks for the Conference**

Social Activities: Free for Participants Who Stay Friday Afternoon

Meet at 2:00 P.M. in Front of Merinos Congress Center

- Visit Village of Cumalikizik
- Karagoz Museum
- Fetih Gate of Bursa & Tophane (Tomb of Osman Gazi and Orhan Gazi, Founders of Ottoman Empire)
- Bali Bey Han Café and Old Commercial Centers and Shopping Tour

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Poster Presentations

Session Chair: Yusuf Ulcay

Mehmet Kanik	*Use of Sodium Borohydride for Stripping of Reactive Dyed Cotton/Elastane Fabrics*
Riza Atav	*Effects of Fixing Agents on Fastness Properties of Mohair Fibers Dyed with Leveling Acid Dyes*
Sennur Alay	*Synthesis and Characterizationof Poly(butyl acrylate)/n-hexadecane Microcapsules and Their Thermal Performances in Fabrics*
Cağlar Sivri	*Bioinspiration of Wood for a Better Impact Absorption*
Dominique C. Adolphe	*The Tapas—The Vegetal Felts Study of the Process of Production*
Gamze Supuren	*Surface Properties of Wool and Various Luxury Fibers*
Muhammet Akaydin	*A Research of Strength and Comfort Properties of Socks Knitted from New Cellulose-based Fibers*
Usha Sayed	*Application of Natural Polymer on Natural Fibers*
Usha Sayed	*Surface Modification of Cotton to Improve its Performance Properties*
Jiyeon Lee	*Intelligent Thermal Insulation of Winter Jacket by Power and Displacement of Embedded SMA Springs*
Ramiz Boy	*Novel Polysaccharide Polymers as Fibers and Films*
Özge Çelik	*Dynamic Analysis of Cam Driven Sley Mechanism*
Pinar Uysal	*The Effects of Ozone Treatment on Soybean Fibers*
Züleyha Değirmenci	*UV Protection of Naturally Colored Cotton Woven and Knitted Fabrics in Comparison to White and Dyed Fabrics*
Asli Çelebioğlu	*Effect of the Solvent Systems on the Morphology of the Electrospun Cellulose Acetate Nanofibers*
Marie Ŝtěpánková	*Resistance of Direct Dyestuffs to Infrared Laser Light*
Marie Ŝtěpánková	*Water-repellent Finish on Plasma Pretreated Fabrics*
Marie Ŝtěpánková	*Contact Angle Hysteresis on Polyamide Surfaces*

Marie Ŝtěpánková	*Estimation of Ti on Textiles by LIBS Method*
Fatma Kayaci	*Morphology of Nylon 66 Nanofibers Produced by Electrospinning from Different Solvents*
Andrea Chládová	*Photocatalytic Textiles Prepared by Sol-Gel Method*
Mouna Messaoud	*Antibacterial Functionalization of Textile Supports by Silver Nanoparticles Formed Through a Combination of Sol-Gel and Photochemistry Routes*
Laurence Schacher	*Characterization of the Color Change of an Iridescent Textile*
Fatma Yener	*Effect of Polymer Concentration on Electrospinning System* REDO REQ
Ali Demir	*Improvement of Artificial Vessel from Nanofibers*
Yakup Aykut	*Photovoltaic PEDOT: PSS-Fullerene (C_{60-82}) Composite Nanofibers Through Electrospinning*
Meltem Yanilmaz	*Polyurethane Polypyrrole Composite Nanofiber*
Suat Cetiner	*Poly(N-Methyl Pyrrole) Containing Semi-conductive P(AN-co-Vac) Composite Films*
Hasan Basri Kocer	*N-Halamine/Quat Copolymers for Antimicrobial Applications*
Ali Ashjaran	*Lasting Antimicrobial Effect of 6-(1-anthraquinonyl amino) Hexyldimethylammonium Bromide on Nylon Fabric*
Murat Yazici	*Micromechanical Modeling of Multilayer Plain Woven Textile Composites*
Remzi Gemci	*Comparisons of Yarn Strength Analysis for Viscose and Lyocell*
Ilkay Yuksek	*Investigation of Regenerated Bamboo, Cotton, and Bamboo/Cotton Blend Yarn Characteristics*
Devrim Soyaslan	*Surface Appearance Evaluation of Some Weft Knitted Fabric Reinforced Composites*
S.A. Mirjalili	*A Study on the Effect of Ultrasound Waves on the Shrinkage of Weft Knitted Fabrics*
Emad Ghods	*Production by Acoustic Struction with Disposable Nonwoven Fabrics*
Maryam Sharzehee	*Antibacterial Finishing of Cotton Fabric by Applying Sulphamic Acid/Urea and Metallic Salts*
Emad Sedighi	*A Study on the Effect of the Method of Tops Production Used in Semi-worsted Yarns for Carpet*
Emad Hezavehi	*Evaluation of Antimicrobial Effect of Surgical Fabric Incorporating Nano Silver Colloid*
Pedram Payvandy	*The Effect of Sewing Seams on Woven Fabric Bending*
M. Hadizadeh	*On Applications of Geometry in Textile Design*
Kyoung Hong	*Effect of the Structure of the Thermal Barrier on the Thermal Protection*

Yasemin Dülek	*Mechanical Characterizationof Polyester-Based Surgical Mesh Coated with Chitosan*
G. Ertik	*Correlation Between Chitosan Coating and Mechanical Properties of Artificial Vessels*
Semiha Eren	*Effect of Fiber Properties on Shrinkage of Fiber/PMMA Composite-Based Bone Cements*
Olcay Tok	*Effect of Fabric Construction on Strength of Automotive Seat Fabrics*
F. Bostan	*Effect of Thermal Finishing and Chemical Compaction on Mechanical Properties of Artificial Vascular Grafts*

Body Modification for Enhanced Sport Performance

G. Montagna[1], H. Carvalho[2,3], A. Catarino[2,3], M. Dias[3], S. Rocha[2,3]

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INTRODUCTION

Body modifications and its presence in human life are as ancient as human life itself. Its achievement can be very different in terms of expression, and with different levels of body aggressiveness. It could be defined as evasive, when something external is used to reach body modification, as in fashion and others forms of art and expression tending to modify human image; or invasive where the body could be permanently modified as in case of body tattooing or physical and flesh modification. Shilling refers to the body as a "project" that being modified helps the construction of a self made human being and a social identity [1].

The natural competition in sports and the demand for better performance forced athletes and their marketing sponsors to propose new products in terms of body resistance and improvement of athlete energy. The aim of this paper is to compare the modifications made in a body due to different kinds of swimsuits used by the same subject and discuss in terms of design what each swimsuit producer understands as the way the design of a swimsuit could contribute for best results. The discussion will also comprehend the main issues regarding swimming: body stabilization through compression, drag reduction and performance endurance.

KEYWORDS

Body Modification; Body Compression; Swimsuit Design; Human Performance; Textile Design

LITERATURE REVIEW

Body modification has been used since the beginning of times by humans to help them to physically and psychologically adapt to different situations and environments.

Usually associated with the sense of embarrassment, body transformation has developed and transformed human life passing trough different stages of dissimulation. Flügel refers the sense of decoration, embarrassment, and protection as the main reason to the use of clothes by humans [2]. From the body painting adopted by natives for self-defence from evil, to the scarification used by tribes to enhance sexual agreement inside the couple, body constrictions have been used to adapt humans to different social occasions. Corporeal surfaces may deliberately [and irreversibly] be altered through whipping, scarification, cicatrisation, piercing, branding, and tattooing – either forcibly by "social institutions […]" or as a matter of personal choice [3]. From east to west probably one of the most meaningful and widespread example of used body constrictions could be represented by feet bounding used in Chinese society for over three thousand years and the use of corsets in the western world with the aim to give a better look to the body by reshaping the internal position of the organs, reshaping flesh and bones [4].

In sports, body modification is also present, however with the objective of obtaining better marks. The last decades showed a particular focus in improving sportswear with the purpose of enhancing the athlete's performance. Studies indicate that compression can help an athlete to recover from fatigue in a shorter period of time [5, 6]. In the particular case of water sports such as swimming, body modification or shaping assumes a very important role, since it can contribute for drag reduction, relaxed muscle stabilization, and fatigue reduction [7, 8, 9]. FastSkin® and LZR®, both from Speedo, are renowned swimsuits that use compression to temporarily modify body dimensions and assure muscle stability in order to improve performance [10]. Body modification applied by the swimsuit is intended to be a reversible and skin-deep modification and is used as a non invasive reshape of the body.

PROBLEM/HYPOTHESIS

In order to achieve the best result in swimming, body compression has demonstrated to be a good method to enhance athlete performance [11] and to control muscle stability all around the body. In the

last few years high performance swimming has witnessed the introduction of numerous body suits that, using the same principle of body compression and hydrodynamics, produced a real step forward in human energy management and variable control in water environment [9]. Based on scientific studies and training tests, each swimsuit brand producer developed his own products [10]. The aim of this paper is to compare different swimsuits in terms of the different body compression zones selected, different garment cuts and component's construction, and compare with a prototype that is being developed in the BIOSWIM® project.

ANALYSIS AND DISCUSSION

High performance swimsuits were tested on the same subject, together with a non-compressive swimsuit and a prototype that is being used in our research project. The prototype swimsuit was made taking into account previously studied weft knitted structures, such as jersey, single and double pique [12]. 3D body scans were made for each swimsuit in similar conditions to ensure comparable data. The resulting images were then analysed by comparing the different swimsuits in the same areas. It was possible to clearly identify areas where the compression was more effective in each swimsuit. It was also possible to observe that some of the swimsuits result in additional stress for some areas of the subject's body, for example in the trapeziums' muscles, as well as in the legs. From the images and measurements taken one could also identify swimsuits with specific stabilization areas, which contribute to reduce the stress on some muscles, as well as to better control the muscle contraction and relaxation. These results are related with the cut and reinforcements used in each swimsuit. Comparing the prototype with the remaining swimsuits one could identify areas that still need to be further improved in order to obtain the correct compression, although other areas already present the expected results.

CONCLUSION

From the observations made, recommended improvements in the prototype under development can be deduced, particularly for the areas where the compression is below the expected values. Some reinforcements should be also considered if reduction of stress is intended in the parts of the swimmer's body that are usually used as support for the swimsuits.

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