



# NTU CHRONICLES

NTU is the Premier Institute of Textile Education  
in Pakistan, Serving the Industry  
Since 1959

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## VISION

National Textile University aspires to have a transformative impact on the socio-economic development of the country in general and textile & clothing industry in particular, with outstanding education, research, and eco-friendly innovation.

## MISSION

The mission of National Textile University is to contribute towards sustainable socio-economic development of society and welfare of humanity through pursuit of excellence in education, research and innovation in the areas of National importance.



## Funding and Grants



*NTU Won Nine Funded Projects from Higher Education Commission of Pakistan under Technology Development Fund*



CODE	PROJECT TITLE	PI	AMOUNT (MILLIONS)
TDF03-045	Development of a Textile-Based Vest for Vital Signs Monitoring	Dr. Abher Rasheed	13.636
TDF03-056	Development of Smart Socks for Measuring Number of Calories Burnt	Dr. Talha Ali Hamdani	13.958
TDF03-087	Development of Smart, Safe & Comfortable (S2C) Helmets for Civil and Combat Applications	Dr. Yasir Nawab	13.983
TDF03-103	Development of Textile Based Smart Sensor for Human Health Monitoring	Dr. Zulfiqar Rehan	7.714
TDF03-106	Development of Durable, Light Weight and Smart Luggage Bags from Composite Materials	Dr. Khubab Shaker	13.540
TDF03-111	Functional, Light Weight, Durable and High Strength Detachable Composite Furniture for Indoor and Outdoor use	Dr. Muhammad Umair	13.602
TDF03-112	Development of Low Cost and Sustainable Nonwoven Fabric Filters to Improve the Quality of Intake Air by Humans and Machines	Dr. Ahsan Nazir	13.174
TDF03-149	Development of Comfortable Compression Socks for Treatment of Varicose Veins or Chronic Venous Disease in Legs	Dr. Hafsa Jamshaid	6.203
TDF03-338	Development of Conductive Fabric and Conductive Films For Development of Smart Garments	Dr. Zafar Javed	11.175

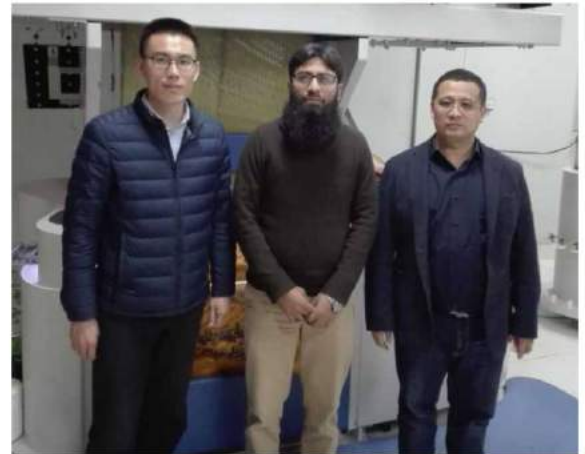


## Important Visits at NTU



### *Chinese Delegation*

Representatives from FCCI and Chinese delegation visited NTU on 9th January, 2019. The purpose of visit was to explore a strategy for the up-gradation and modernization of small and medium weaving units of Faisalabad. Tony Wang (General Manager), Qingdao Eagle Soar Machinery Co. Ltd. appreciated the facilities available at NTU. He further showed his interest in joint collaboration. Rector NTU Dr. Tanveer Hussain thanked Chinese consultants for their cordial & extensive cooperation.



### *Delegation from Uzbekistan-Pakistan Business Council*



Mr. Furqat Sidiqov (Uzbekistan Ambassador in Pakistan), Mr. Khalid Taimur Akram from Uzbekistan-Pakistan Business Council and Mr. Muhammad Afzal Khan from MAK & Sons visited National Textile University on January 28, 2019. The purpose of the visit was to enhance mutual understanding and strengthen student and faculty exchange program. The Rector, NTU Dr. Tanveer Hussain and Dean Faculty of Engineering and Technology, Dr. Yasir Nawab gave official welcome to Uzbek ambassador and his team. The Rector gave a presentation on National Textile University and its role in textile industry of Pakistan. It was followed by the presentation of Mr. Furqat Sidiqov. The ambassador gave an overview of textile industry of Uzbekistan. He explained that textile industry of Uzbekistan is majorly cotton centric and Uzbek is the top producer of cotton in the world. So, a mutual collaboration between Uzbekistan and Pakistan will strengthen textile sector.



### *Visit of Deputy Commissioner Faisalabad*

The Deputy Commissioner Faisalabad, Sardar Saif Ullah Dogar along with Assistant Commissioner City, Ms. Shumaila visited NTU. During their visit, they were briefed about the role of NTU in nation building and uplifting textile sector of the country. They also visited state of the art labs of the university. They appreciated the vision and commitment of Rector NTU and assured every possible assistance in taking the university to new horizons of research and development. Later, the DC planted a tree in the university.







### *Dr. Athar Osama (ICT Planning Commission, Pakistan)*

Dr. Athar Osama (Member Science and Technology and ICT Planning Commission, Pakistan) visited National Textile University (NTU) and interacted with PhD faculty members of Faculty of Engineering and Technology (FET). He exchanged views with the academia to further improve the quality of education and research to prepare and enable youth of Pakistan to play their due role in making it a developed country.



### *Rector NTU Meets President Islamic Republic of Pakistan*



Rector NTU, Prof. Dr. Tanveer Hussain visited Aiwan-e-Sadr, Islamabad to meet his Excellency, Dr. Arif Alvi, President Islamic Republic of Pakistan. Being the Chancellor of NTU, the President was briefed about the role of NTU in strengthening the Textile sector of the country along with the academic and research activities going on at the university. Mr. Farrukh Habib, MNA and Parliamentary Secretary for Railways accompanied the Rector on this occasion.



### *Chinese Ambassador & Federal Parliamentary Secretary for Railways*

Chinese Ambassador to Pakistan Mr. Yao Jing accompanied Federal Parliamentary Secretary for Railways MNA Mian Farrukh Habib on his visit to National Textile University (NTU) Faisalabad. Rector NTU Prof Dr. Tanveer Hussain welcomed the guests and briefed them about the university. A detailed visit to the department of Spinning, Weaving, Knitting, NTRC and Textile processing was conducted by the guests. In his remarks to faculty and students, Ambassador Mr. Yao Jing assured that China will collaborate with Pakistan in revamping of the textile sector which would help to maintain its inherent edge in this specific field through technology transfer. China will help Pakistan in high-level technology transfer and it would help the textile industry in Pakistan which carries immense potential. The convoy assured that China would help meet the technological needs of Pakistan and take appropriate steps for the manufacturing of sophisticated textile machinery within the country. Federal Parliamentary Secretary for Railways MNA Mian Farrukh Habib stressed the importance of the textile industry and appreciated the role of NTU in modernization and raising the capabilities of industry. He also proposed the Chinese Ambassador to Pakistan to develop a PAK-CHINA Textile Center at NTU.





## Events Organized by NTU



### *"3rd Knit to Achieve" Competition*

Department of Knitting in collaboration with Hosiery Manufacturers and Exporters Association successfully organized the 3rd Knit to Achieve; a product development competition. Mr. Ajmal Cheema the provincial minister of Punjab for social welfare and bait-ul-mal was the chief guest. Mian Kashif Zia (Vice Chairman PHMA), Mr. Muhammad Adrees (CEO; Sitara Chemical Industries), Mr. Asif Iqbal Chaudary (Commissioner Faisalabad), Syed Zia Alamdar Hussain (Senior Vice President, Faisalabad Chamber of Commerce and Industry), Mian Mohammed Latif (Chairman Chenab Group), Dr. Sofia Anwar (Vice Chancellor; Government College Women University Faisalabad) and Mr. Hans ul Rick (Keck CEO Merz maschinen fabric) were amongst the distinguished guests. Student representatives from different universities of Pakistan displayed their projects in technical and fashion categories.



### *5th International Conference on Value Addition and Innovation in Textiles*



National Textile University, Faisalabad, organized the two-day international textile conference and scientific exhibition. Student delegations from various institutes of the country and audience from the textile industry participated in the event. The two-day conference and exhibition were inaugurated by Prime Minister's special Advisor for Trade and Industry, Dr. Abdul Razzaq Dawood. National and Foreign delegates from Malaysia, Morocco, Sudan and China attended the conference and presented their views to the participants.







## 4th DICE Innovation Event 2019

National Textile University, Faisalabad, organized the two-day international textile conference and scientific exhibition. In which, student delegations of various institutes from all over the country and audience from the textile industry participated in the event. At the end of the conference, prize distribution ceremony was organized for the students. A Jacquard woven portrait of Prime Minister of Pakistan, Mr. Imran Khan, was presented by Rector of National Textile University, Prof. Dr. Tanveer Hussain to Ms. Aalia Hamza Malik, that was developed by the department of weaving of National Textile University.



## Extreme Talent Contest (XTC-6.0) Success Story of Department of Computer Science



Department of Computer Science organized an event, entitled as "eXtreme Talent Contest XTC-6.0" that was inaugurated by Prof. Dr. Tanveer Hussain (Rector NTU) along with Mr. Salman Saif (Registrar NTU), Prof. Dr. Zahid Rizwan (Dean FoS), Dr. Zafar Javed (Dean FHSS) and Dr. Amjad Javid (Advisor Students) on dated April 12, 2019. XTC is the success story of Department of Computer Science and this was the 6th consecutive flavor here in NTU. Over 1800+ participants from different universities and colleges have participated in all five categories (i.e., Technical, Non-Technical, E-Gaming, Sports and Social). Different national news channels, Youtubers, V-loggers have covered the energetic moments and excitement of the event.





## Careers/Job Placement



### Recruitment Drive

HR Team of Following Industries Visited NTU for Recruitment Drive

Ibrahim Fibers Pvt Ltd Faisalabad

Masood Textile Mills Pvt Ltd Faisalabad

Sapphire Finishing Mills Pvt Ltd Lahore

Mehmood Group Pvt Ltd

Style Textile Pvt Ltd Lahore

Cotton Web Pvt Ltd Lahore

Ambition Apparel Pvt Ltd Lahore



### Career Drive

Career Drive on the Following Topics took place at NTU

Fulbright Master's and PhD Degree Program/  
Graduate Record Exam Informational Session

Awareness session by ABN  
(Overseas Education) & IELTS Mock Test

GRE Mock Test & Result for  
Fulbright Scholarship-PHASE III

Session by USA Universities Representatives





## Seminars/Workshops/Trainings



### Seminar on "Entrepreneurship a Viable Career Option"

A seminar was organized on the topic "Entrepreneurship a Viable Career Option" by the Department of Management Sciences. Honorable Guest was "Ishfaq Jilani From IKTAR.org". He showered a productive insight for the final year students.



### Seminar on "Environment Issues in Textile Industries"

Society of Textile Knitters arranged a seminar on "Environment Issues in Textile Industries". Mr. Shafqat Ullah from Cleaner Production Institute, Lahore delivered his speech on the topic "Environment Issues & Cleaner Production Options for Textile industry of Pakistan", while Mr. Junaid Ali from Interloop delivered his speech on "Environmental management at industrial level".



### Seminar on the Topic "Optimization of Sizing Recipe"

Society of Textile Weavers arranged a seminar on the topic 'Optimization of Sizing Recipe' on December 26, 2018 in NTRC conference room. Mr Zaheer Abbas (Project Manager TEVTA) delivered the lecture as guest speaker. The main objective of the seminar was to develop the sense of right technique of sizing in students. At the end of seminar, souvenir was presented to the guest speaker by Dr. M. Zubair (Assistant Professor; Weaving Department).



### Seminar on the Topic of "Working Safely"

Society of Textile Weavers arranged a seminar on the topic 'Working Safely' on December 28, 2018 in Main Hall, National Textile University. Mr Imtiaz Ali Aslam (MIIRSM, Grad IOSH), Health and Safety Specialist delivered the lecture as guest speaker. Mr. Imtiaz Aslam is currently working as a Senior Safety Instructor and Training Director at EDCONS Institute of Business and Technology, Islamabad. The main objective of the seminar was to develop awareness in students regarding working safely. In addition, Mr Imtiaz also conducted the audit of weaving labs.







## 6 Months Diploma in Garment Manufacturing of NAVTTC

Certificates and Stipend distribution ceremony of 6 Months Diploma in Garment Manufacturing of NAVTTC was held on January 16, 2019. Prof. Dr. Tahir Hussain (Focal Person NAVTTC) congratulated the participants on successful completion of course and distributed the certificates to them along with Mr. Mirza Mahmood Akhtar (Lecturer GMD/NAVTTC Coordinator). Total 25 students were enrolled in said course. The program was started on May 14, 2018 and ended on November 23, 2018.



## Seminar on the topic "Vision, Mission & Goals of Life"



Society of Textile Weavers arranged a seminar on the topic 'Vision, Mission & Goals of Life' on February 20, 2018 in NTRC conference room. Mr. Rana Sohail (CEO Shan Associates) delivered the lecture as guest speaker. The main objective of the seminar was to develop the sense of organized and goal-oriented life among the students of final year weaving.



## Session on "Merchandising Management Techniques in Apparel Industry"

"An interactive session was arranged by Society of Garment Manufacturers on "Merchandising Management Techniques in Apparel Industry" with Mr. Zubair Mujtaba (Merchandising Manager Masood Textile Mills Ltd Faisalabad) on March 11, 2019. He provided the students awareness of different management techniques and strategies in Apparel Merchandising process. At the end, Convener Garment Society Mr. Mirza Mahmood Akhtar (Lecturer GMD) presented the shield to honorable guest speaker.



## Lecture on "Physical Testing Equipment along with the Importance of Accessories"



Society of Textile Spinners arranged a Technical lecture on the topic of "Physical testing equipment along with importance of accessories" on April 21, 2019 for the final year students of B.Sc. Textile Engineering. Society of Textiles Spinners invited Mr. Claudio Bertolotti Sales Manager of M/S Mesdan S. P. A Italy as the resource person. He explained various testing equipment used in textile and also talked on the importance for proper testing techniques and why they are necessary. Students gained fruitful knowledge of the relevant topic and the session proved very useful in enhancing technical knowledge.





### Interactive Session on Technical Textile



An interactive session was arranged by society of textile knitters on Technical Textile with Mr. Keck, Hans ul Rick (CEO of Merz Maschinen fabrik, Germany) on 14th February, 2019. He guided the students about medical compression stocking, their raw materials, their manufacturing process, its knitting and its testing method. At the end, students asked him different questions about machines and medical compression stockings.



### Training Workshop on Unit Production System

An interactive training workshop on Unit Production System (UPS) was arranged by Society of Garment Manufacturing with trainer Mr. Faizan (Manager Industrial Engineering, Image Garments (Pvt) Ltd. Faisalabad) for the students of 8th semester of Garment Manufacturing on February 22, 2019. The Purpose of this training workshop was to familiarize the students with the working of latest machinery used in Garment Industry. At the end, students asked him different questions about Euratex UPS.



### A Training on the Topic of "How to Write a Research Thesis"

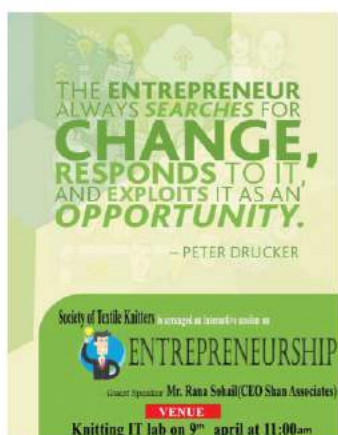


A training on the topic of "How to a Write Research Thesis" was organized on February 27, 2019 by Department of Weaving, for Postgraduate Students. Dr. Muhammad Umair (Assistant Professor, Department of Weaving) served as a resource person. Twenty five (25) participants benefited from this training.

### Interactive Session on Entrepreneurship



Society of Textile Knitters arranged an interactive session on entrepreneurship on 9th April 2019 in Knitting IT lab of NTU. Mr. Rana Sohail (CEO of Shan Associates; a graduate of National Textile University, Faisalabad) was the guest speaker. He informed the students about his success story and guided them how to start new business. Students asked him different questions regarding new business ideas and startup.







## Outcome Based Education and its Implementation

A training on the topic of Outcome Based Education (OBE) was organized on January 17, 2019 by Department of Weaving, for the understanding of faculty on this topic. Dr. Tanveer Iqbal, Associate Professor and Incharge Campus from University of Engineering & Technology, KSK Campus Lahore, served as a resource person. Sixty-two (62) participants benefited from this training.



## MoUs and Collaborations



### NTU, Faisalabad signs MOU with Tianjin Polytechnic University, China



On December 17, 2018, NTU signed a Memorandum of Understanding (MOU) with Tianjin Polytechnic University, China. Both institutions agreed to promote joint degree at undergraduate and master level, student exchange and study tour, faculty and/or staff exchange, joint research laboratory, communication and cooperation of Textile Industry Association, the joint research projects for graduate students, the collaboration of Chinese language teaching and testing center.



### MoU Signed between Knitting Department and Kamal Hosiery Mills, Faisalabad

MOU Signing ceremony between NTU and Kamal Hosiery Mills, Faisalabad was held on January 21, 2019. MOU was signed by Prof. Dr. Tanveer Hussain Rector National Textile University and Mr. Kumara (COO) Kamal Hosiery Mills. The mutually decided objectives related to research & development, services, and internships opportunities were covered under this MOU.



### MoU signed between Garment Manufacturing Department and Ambition Apparel Lahore



MoU Signing ceremony between NTU and Ambition Apparel, Lahore was held on February 19, 2019. MoU was signed by Dr. Yasir Nawab, Dean/ Director FET, NTU and Mr. Sher Ali (Senior Manager HR & Compliance) Ambition Apparel Lahore. The mutually decided objectives related to research & development, services, internships, job opportunities and scholarships offering from Ambition Apparel Lahore were covered under this MoU. Dr. Abher Rasheed (Chairman GMD), Mr. Mirza Mahmood Akhtar (Lecturer GMD & Coordinator Industrial Liaison) & Mr. Tahir Ali Khan (Manager Administration Ambition Apparel Lahore) were also present during MoU signing ceremony.







## Lincoln Method and NTU signed an MoU to Develop EdTech Platform

Lincoln Method and NTU signed an MoU and launched Center of Managerial Entrepreneurship (CME). The CME will offer online-courses and will issue certificates to individuals. The MoU also states to materialize industrial surveys to take industrial feedbacks and to improve education for the industrial workforce. EdTech will also offer industrial courses for the certification of managerial entrepreneurship.



## ARCHROMA Joins Hands with National Textile University



Archroma, a global leader in color and specialty chemicals has signed a Memorandum of Understanding (MoU) with the National Textile University (NTU), Faisalabad, Pakistan. The MoU will pave the way for cooperation initially for a period of five years. The partnership will explore innovations in textile research with futuristic visualization to support the textile industry enabling it to align with the fast pace of global requirements and evolutions. Another important aspect of this collaboration is research in non-conventional technical textiles in the field of unsaturated polyester resins in establishing quality and accessible product lines.



## School of Leadership (SoL) and NTU signed MoU to Develop Fellowship Programmes

School of Leadership (SoL) Foundation and NTU signed MoU and launched DICE (UK) fellowship programme of British Council offered to enterprises on April 12, 2019. This MoU states to extend capacity building mentoring and support within the economic system. SoL will also offer range of training modules related to strengthen academia; the teachers, administration-management/staff and cater to youth studying in university. In addition to this, they also provide development programs for young professionals who have recently embarked on their careers for the certification of diversified professional development.



## MoU with Shanghai Open University to start a Chinese language centre at NTU



National Textile University and Shanghai Open University have entered into a Memorandum of Understanding to collaborate for starting a Chinese language centre at NTU. The MoU was signed by Prof. Wen YUAN, President Shanghai Open University and Prof. Dr. Tanveer Hussain, Rector National Textile University. Both universities agreed to strengthen their linkage and to start planning for the earliest start of language centre at NTU. Moreover, a proposal was also discussed to establish a Pakistan Design Centre at SOU and Pakistan Corner at harbour-6 of SOU. There will be more elaborate discussions between the two sides to materialise the concepts.





## Participations in National and International Events



### *FET Participated in Conference Cum Expo at PCSIR*

A three days conference cum expo was arranged at PCSIR, Lahore. A total of 26 exhibitionist, industrialist and academia displayed their products. A team from NTU led by Mr. Hasan Iftekhar (Lecturer, NTU) participated in this exhibition. NTU exhibited several products. Like bulletproof vest, carbon composite impellers, etc. The portrait of President and Prime Minister of Pakistan received special attention by the visitors. The main objective of the conference was to realize and emphasize on the potential of Higher Education in Pakistan and to facilitate the engagement between academic institutes, industry, policy makers and leadership to share and recommend best practices. It also provided an opportunity for the representatives to present and discuss the most recent innovations, trends, and concerns pertinent to higher education. In concluding remarks of the conference it was endorsed that science, technology and innovation are pivotal for quality education and entrepreneurship.



### *Dr. Zulfiqar Ahmad Rehan Delivered a Keynote talk on "Membrane Technology"*



Dr. Zulfiqar Ahmad Rehan, Assistant professor in Department of Polymer Engineering was invited by University of Agriculture, Faisalabad to give a Keynote talk on "Membrane Technology: A sustainable solution to future drinking water needs" in "International Symposium on Technologies and Materials for Renewable Energy, Environment and Sustainability" held on February 6-7, 2019.



### *Presentation of Research Paper in International Conference*

Dr. Muhammad Asif Assistant Professor/Chairman, Computer Science Department at National Textile University, Faisalabad presented his research article in an international conference held in Malaysia jointly organized by ACM and UMP from February 19-22, 2019. This work was funded by HEC Pakistan in the form of an international travel grant.







## *FET Participated in IGATEX 2019, Karachi*

Faculty of Engineering and Technology participated and displayed its stall in IGATEX 2019. The 12th International Exhibition for Garments, Textile Machinery and Accessories was held in Karachi from February 26-28, 2019. A team from NTU which included Mr. Zeeshan Azam and Sikandar Abbas Basra along with students participated in exhibition. More than 500 companies hailing from 37 different countries exhibited their products and latest technologies in the fair. Textile products along with detail of services which NTU provides to textile industry were displayed in NTU stall.



## *Presentation of Research Papers in the International Research Conference at KSA*



Writing a paper needs a lot of work: collecting, organizing, analyzing and visualizing the data everything from the experimental section to discussion in a clear and effective manner. Out of 8 produced research articles, 6 were selected to submit and 3 got acceptance after blind peer reviewing process in an International Conference organized by Al-Yamama University, KSA. This outcome is emerged from BSSE students of 7th semester in semester project assignment of course, "Simulation and Modeling" by Dr. Sohail Jabbar. Its curriculum comprised of Simulation, Modeling, Analysis, and Visualization. Apart from covering a comprehensive course outline, students learned analysis and visualization tools and this particular semester project was relevant to analysis and visualization part of the curriculum.

- (1) Fiza Khan, Zahra Hafeez, Aimen Ijaz, Maryam yousuf, Reda Shaheen, 'Predicting factors to get maximum social media engagement of customers for brand building'
- (2) Shahnoor Ali, Hasan Sarwar, Hala Yasmin, Umar Hayyat, Zain-ul- Abidin, Muhammad Rehman Shahid, 'Using Logistic Regression to Predict Secondary School Student Performance'
- (3) Shahzad Ali, Muhammad Usman, Dawood Saddique, Umair Maqbool, Muhammad Usman Aslam, Shoaib Ejaz, 'Prediction of Diabetes Disease using Data Mining Classification Techniques'



## *Presentation of Research Article in 6th International Conference at UMT*

Mr. Usman Ahmed (Lecturer; Department of Knitting) presented his research article in '6th International conference on Textile and Clothing held at University of Management and Technology Lahore, Pakistan. Mr. Usman is carrying out his research on Knitted Fabric under the supervision of Dr. Hafsa Jamshaid (Chairman DOK). Mr. Usman has already presented three research papers in the international conferences.







### *Dr. Hafsa Jamshaid Participated as Guest of Honor in 6th ICTC 2019*

Dr. Hafsa Jamshaid participated as a guest of honor in "6th International Conference on Textile and Clothing (6th ICTC 2019)" held on March 8-9, 2019, organized by School of Textile & Design, University of Management & Technology (UMT), Lahore.



### *QEC Team NTU Participated in One Day Workshop*

QEC team of National Textile University participated in a one-day training workshop on "Design & Development of Curriculum and Its Assessment Techniques" on March 14, 2019. Dr. Muhammad Idrees (Director Academics, Higher Education Commission (HEC) Islamabad) was the resource person of the said training Workshop. The focus of the training was on curriculum design and development towards Outcome-Based Education.



### *QEC Team of NTU Attended 1st International Seminar on QS World University Ranking*

QEC Team of National Textile University visited University of Lahore, Lahore to attend 1st International Seminar on QS World University Rankings on March 29, 2019. The key speakers were Ashwin Fernandes (Regional Director, QS Intelligence Unit) and Ms. Maryam Riaz Wattoo (Advisor, Ministry of Education United Arab Emirates). The presentation covered methodologies of the QS World University Rankings and showcased information related to the recent release of the rankings.



### *Presentation of Research Work in 8th Invention to Innovation Summit*

Student from the Knitting Department (Mr. Muhammad Saqlain Akhtar and Ms. Aiman Arooj) presented their research work in Technologies for Textile and Leather held in 8th invention to innovation summit held in Punjab University Lahore.





## Department of Knitting Celebrated "Green Day"

Department of knitting celebrated "Green Day" to motivate the students for reducing the wastage. Students from the Knitting department developed different recycle products using daily life waste. A walk of NTU campus named "Walk for Green Day" was also organized in presence of Dr. Hafsa Jamshed (HoD, Knitting) and our guests Mr. Shafqat Ullah and Mr. Junaid Ali.



## International Women's Day 2019 #Balance for Better



"Explore Yourself Achieve Your Targets" Celebrating the Spirit of Women's to mark "International Women's Day" on Friday March 8, 2019 at National Textile University Faisalabad was organized by NTU WING Society. A panel hosted by Mr Adeel Ahmad (Asst. Controller Examination) and Mrs Nadia Shamim (Asst. Director Students Affairs) with a group of inspiring women including Educationist Mrs Noreen Alvi (Former Vice Chancellor of Govt. College University for Women FSD), Social Activist Dr. Bushra Qaiser (Political working as Gen Secretary Women FSD Pakistan Tehreek e Insaaf), Industrialist Mrs. Farzana Musadaq (Non-Executive Director of Interloop), Vice Chairperson SOS Children's Village FSD (Additionally working for "The Citizen Foundation" serving for Education of under privileged children).



## Tax Day Celebrations

As a forerunner part of Tax Day celebrations, NTU Debating Club arranged a tutorial and debate to increase tax awareness amongst new generation at April 10, 2019. The event was presided by Ms Asma Iqbal (Convener NTU Debating Club) and M. Afraz Alam (President, NTU Debating Club).



## Importance of Positive Attitude for Textile Graduates



Society of Textile Technologists arranged a Seminar on "Importance of positive attitude for Textile Graduates". The honourable guest speaker "Mr. Nauman Hameed" (Mills Manager at Sapphire Unit #6) discussed the key characteristics of positive attitude for successful career with the students.





## Achievements and Awards



### HEC Issued NOC for PhD in Advanced Materials

Higher Education Commission, Islamabad has granted NOC for launching of PhD in Advanced Materials at National Textile University, Faisalabad. Dr. Yasir Nawab (Dean, Faculty of Engineering and Technology) narrated that launching of PhD in Advanced Materials is an honor for the Faculty of Engineering and Technology and NTU. The research on innovative and revolutionary materials will be carried out under this program according to the modern standards keeping in view the challenges faced by industrial sector in Pakistan.



ہیجر اکیڈمی کمیشن  
**HIGHER EDUCATION COMMISSION**  
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Muhammad Ismail  
Consultant (Quality Assurance Division)

NO. 1-46/2018/QAD-NOC/HEC/NTU/  
Dated: December 19, 2018

Subject: NOC prior to launching of PhD in Advanced Materials.  
Dear Sir,

Kindly refer to earlier correspondence on the subject cited above. I am pleased to share that on the basis of information provided by the National Textile University Faisalabad that PhD in Advanced Materials is in line with HEC Minimum Criteria for Admission in MS/MPhil and PhD Program and award of degrees. Therefore, HEC has no objections as per of FNU in accordance to criteria valid Feb. 2017 by the National Textile University Faisalabad.

It may be re-iterated that, besides other requisites, the minimum requirement to launch and continue conducting an MS/MPhil/MDA/Equivalent program and a PhD program is to have a minimum two and three relevant PhD faculty members, respectively, at all times. However, HEIs are requested to have appropriate student-teacher ratio in view of the research thesis supervision.

Further, HEC QA policies defined in MS/MPhil & PhD criteria and notified from time to time will also be applicable in said program. Moreover, HEC reserves the right to withdraw the NOC in case it finds that University is unable to demonstrate its ability and commitment to meet the HEC minimum criteria for admissions, Curriculum, faculty, scheme of studies and semester guidelines etc.

With kind regard,

Muhammad Ismail  
(Muhammad Ismail)



### Department of Design, Won 2nd Position in BIZHUB 2019

Another achievement added to the account of Department of Design by securing second position in BIZHUB (Inter-University Business Plan Competition 2019) at University of Education, Multan. In the competition an idea of Wearable Zero Waste was presented by Ms. Aroobah Mumtaz and her team from final year Fashion Design Department. It was all Pakistan Business plan competition in which more than 30 unique and creative ideas were presented.



### XTC-6.0 Prize Distribution Ceremony

To acknowledge and reward the efforts of the winners from different universities, colleges, technical institutes and individuals, a Prize Distribution Ceremony was held at NTU Main Hall on Sunday, April 14, 2019. Mrs. Iram Sarwar (Additional Commissioner Income Tax, Faisalabad) was the chief Guest and Professor Dr. Zahid Rizwan (Dean FoS & Director QEC) was the Guest of Honor. Mr. Waqar Ahmad along with all the faculty and staff members of Department of Computer Science also esteemed the ceremony.







## Department of Knitting, Students Won Prizes in 3rd Knit to Achieve

Students of 3rd year of Knitting Department Ms. Sadia Pervaiz and Mr. Abdullah secured 1st position in their project entitled "Headphone for Enjoying Noise", while Mr. Talha Khan & Ms. Zainab Tariq; final year students, secured 2nd position for their project titled "Knitted Denim" in 3rd Knit to Achieve Technical Category.



## Department of Computer Science, Won the Best FYP Award at UAF PASTIC Expo 2019



Three students from the Department of Computer Science, NTU, Muhammad Usman Aslam, Aiman Nadeem and Zain-ul-Abidin have won the Best Project Award in PASTIC-UAF ICT EXPO 2019. One day PASTIC-UAF Information, Communications and Technology (ICT) Exhibition was held on February 20, 2019 at the Expo Center, University of Agriculture Faisalabad. For years, Pakistan Scientific and Technological Information Center (PASTIC) in collaboration with UAF Organized this Exhibition, which was meant to promote innovative ideas and to move towards knowledge based economy. The inaugural session was held at New Senate Hall of UAF, in which UAF's vice chancellor Dr. Zafar Iqbal Randhawa, whereas FCCI president and PASTIC director general were the guests of honour. The expo was themed innovative trends in sciences and education in which companies and different Universities across the country participated. Department of Computer Science NTU was particularly enthusiastic in PASTIC-UAF ICT EXPO 2019. The students held a demonstration show casing some of the NTU Computer Science department's finest current projects. Title of the Award winning Project was "Analysis of Emerging Technology Trends around the Globe: 2014-18" based on Data science. The project that was selected for the Best Project Award at PASTIC-UAF ICT EXPO was judged by Professional scholars & experts.



## Department of Design Won 2nd Position in SDC-UK International Design Competition 2019

Competitions play a vital role in the implementation of knowledge and learning in real life situations. Talented Designers at NTU are always in the forefront of competing with the world. Ms. Amea Khalid (8th semester BTDT) won second position in SDC-UK International Design Competition 2019 (All Pakistan region). The topic of competition was Color and Nature. She presented her Prototype of final year project titled 'Value added Application of Non Woven sheets with the design inspiration of Relish Spices'. Jurors and visitors at the competition specially praised the unique blend of technology with design which is a motto of Design Department at NTU.







## QEC Completed the 2nd Cycle of Self-Assessment Process for Master of Science in Mathematics Program

Quality Enhancement Cell (QEC) of National Textile University has completed the 2nd Cycle of Self-Assessment Process for Master of Science in Mathematics Program. The assessment team visited Department of Applied Sciences of the university for the assessment of Master of Science in Mathematics Program on March 13, 2019. The Team comprised of the following members: Dr. Abdul Rauf Nizami, Associate Professor, University of Central Punjab, Lahore, Dr. Wajeeha Javed, Assistant Professor, University of Education, Lahore, Prof. Dr. Zahid Rizwan Director, Quality Enhancement Cell, National Textile University, Faisalabad, Dr. Zulfiqar Ali, Associate Professor/ Director, Graduate Studies & Research Dr. Zulfiqar Ali Raza, Assistant Professor/ Chairman Department of Applied Sciences, Dr. Nadeem Nasir, Assistant Professor/Director, Graduate Program, Faculty of Science, Dr. Umber Sheikh, Assistant Professor/ Program Team Member MS Mathematics, Engr. Muhammad Haroon, Assistant Director, Quality Enhancement Cell, National Textile University, Faisalabad, and Mr. Muhammad Naeem, Lecturer/Member, Quality Enhancement Cell, National Textile University, Faisalabad.



## Department of Design, Won 2nd Position in 4th NTU-DICE Innovation Event 2019



Creative designers from Design Department exhibited their various innovative and artistic ideas and projects in 4th NTU-DICE Innovation Event 2019. The project by Ms. Amea Khalid and Ms. Dania (8TH BTDT) title "Value Added Applications of Non Woven sheet in Apparel and Home fashion" won second position in the category of design. The project was supervised by Ms. Aroobah Mumtaz, Ms. Amna Sarfraz and Dr. Abdul Jabbar.



## Department of Knitting, Students Won SATHA Innovation Awards

Mr. Muhammad Saqlain Akhtar and Mr. Anas Ashiq, from the Department of Knitting won the SATHA innovation award for their project titled "Bandage for burnt wounds". Similarly Ms. Aiman Arooj (Project Leader), Ms. Maria Latif and Mr. Ammar Tariq Cheema also won the SATHA innovation award for their project titled "Compression Bandage for Hypertrophic scars". SATHA Innovation Award is an international award by South Asia Triple Helix Association as Part of International Triple Helix Association. SATHA Awards are given at annual dinner of each summit. These Awards are given for Development by Academia, Industry, Public and Social Sector.







## Some Glimpses of Sports Activities at NTU









# Market Insight, Trends and Technical Innovations of Fibers in the World

Zuhaib Ahmad\* & Tahseen Ullah

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## Global fiber market

In 2017, global fiber production exceeded 100 million mt resulting in the largest fiber production volume ever. Global fiber production saw a tenfold increase from 1950 to 2017 from <10 million mt to over 100 million mt. Synthetic fibers have dominated the fiber market since the mid 1990s when they overtook cotton and became the dominant fiber. With around 65 million mt of synthetic fiber, this fiber category made up approximately 60 percent of the global fiber production in 2017. Polyester has a market share of around 51 percent of total global fiber production. More than 53 million mt of polyester is produced annually. Cotton is the second most important fiber since synthetics took the lead in the mid 1990s. With around 26 million mt it has a market share of approximately 25 percent of global fiber production.

An increasingly important fiber category is manmade cellulosics (MMCs) with a global production volume of around 6.5 million mt and a market share of around 6-7 percent in 2017. Viscose is the most important MMC with a market share of almost 80 percent of all MMC fibers and a production volume of around 5.2 million mt. Wool has a market share of around one percent with a global production volume of a little over one million mt. Other plant-based fibers including jute, linen and hemp, together have a market share of about five percent. Silk and down have market shares of less than 1 percent. The need to decouple growth from resource consumption gets more urgent every year. The significant growth in fiber production results in a significant use of natural resources and a huge production of textile waste. There is a growing awareness of the urgent need for a more responsible use of resources, enabling growth without increased resource consumption. Innovation towards a circular economy and dematerialization can be seen in almost all fiber categories. Accelerating such initiatives will help to reduce the overall fiber footprint on the planet. The ban on importing certain plastic waste including PET bottles to China has caused increasing prices and will result in a lower PET production volume. The ban of mulesing in New Zealand has led to a shift in the debate on mulesing beyond the national borders. While the proposals for synthetic textile labelling regulations in California and Connecticut, USA, have received major media and industry attention.

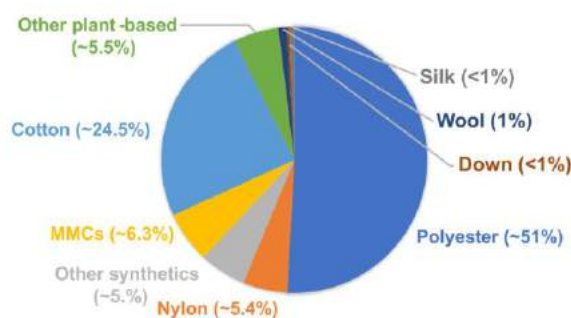


Figure 1 Global fiber production

## Technical Innovation in Fibers

New preferred fibers and materials are emerging. Manmade cellulosics currently witness a very active innovation landscape. Being biobased and with a potential for closed loop systems, MMCs can play an important role in the growing market for circular and biobased fibers. Refibra™ (where Tencel™ is produced by upcycling of cotton scraps), Naia™ (made from the cellulose esters of renewable wood pulp) and Orange Fiber (from citrus juice by products) are some examples of new innovations of manmade fibers.

Biosynthetics such as biobased polyester, nylon and spidersilk are an important new emerging fiber category e.g. Fulgar's EVO®, Bolt Threads' Microsilk. Biobased fibers are the alternative to oil-based fibers, particularly as the future availability and stability of oil becomes a higher risk.

## Recycling

The number of initiatives working on fiber-to-fiber recycling is increasing e.g. Re:newcell, HKRITA, Infinited Fiber. There are recycled fiber options in all fiber categories e.g. recycled cotton, wool, down, MMCs, polyester and nylon but the share of fiber-to-fiber recycling is still very low (estimated at below 1 percent by the Ellen MacArthur Foundation). The amount of global textile production and consumption is increasing. Around 48 million mt of clothes are disposed annually, with around 75 percent of them landfilled or incinerated. There is a growing awareness of the urgent need for a more responsible use of resources, enabling growth without increased resource consumption. Innovation towards a circular economy and dematerialization can be seen in almost all fiber categories. Accelerating such initiatives will help to reduce the overall fiber footprint on the planet.



## Recent Yarn Market Trends and Technological Developments in Fibers and Spinning

Muhammad Bilal Qadir, Shahzad Shaffi, Amir Shahzad & Zulfiqar Ali\*

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Being an agricultural land, Pakistan is the 4<sup>th</sup> largest producer of the cotton. It had remained the third largest cotton consumer until 2014. The cost of raw materials contributes about 70% to the total yarn cost. The demand for value addition in textile exports has been increased during the last decade for which better quality cotton is of prime importance. Unfortunately, cotton growers in Pakistan have badly failed to grow better quality cotton long staple length, high yield and low trash due to which imports of raw cotton have been increased. Yarn exports over the past decade are reduced, which is often blamed on Vietnam and other East Asian countries, capturing Pakistan's market share. The locally manufactured yarn is not just losing the popularity contest in the export market; the domestic value-added sector is also not its biggest fan either. For the past decade, various garments, apparels, and readymade textile manufacturing associations have heavily lobbied the government to loosen the duty regime on yarn import, which they say is necessary to keep the textile sector competitive. Value-added sector enjoys duty drawbacks on imported yarn thus further disincentivizing domestically manufactured yarn's market. However, yarn's woes are not entirely spinner's fault. The domestic value-added sector continues to become more sophisticated, demanding better quality cotton, and the local growers have failed to play catch up. The rise in cotton prices in coming days and a steep fall in the rupee value against the dollar is expected to give a competitive edge to Pakistani products including cotton yarn in the world market. The market expects higher cotton yarn exports which will in return trigger demand for cotton in the domestic market. However, many analysts believe that the gain would be short-lived. Some analysts say that cotton crop would not be more than 10.5 million bales, less than 1m bales over the last season 2017. This means a huge quantity of around 4.5 million bales would have to be imported if the textile industry revives after the devaluation of the rupee.

According to the economic report of Pakistan spinning sector which is still considered as the backbone in the ranking of textile production. Presently, as per record of Textiles Commissioner's Organization (TCO), it comprises 517 textile units (40 composite units and 477 spinning units) with 13.414 million spindles and 199 thousand rotors installed. Out of which 11.338 million spindles and 127 thousand rotors are operational with capacity utilization of 84.5 percent and 64 percent respectively. This capacity could also be increased if the government incentivize this sector which will obviously boost the economy of the country.

### Technical innovation in Spinning

Pioneer Swiss manufacture Rieter has made innovations in its spinning machinery. Rieter technology produces reliable and economical high-quality yarn. The ring spinning machine with compact and non-compact systems flexibly produces high-quality and special yarns with the highest performance. Sophisticated technical solutions of Rieter, even ring machines with up to 1824 spinning positions are highly efficient in energy consumption and productivity. The Rieter auto-doffer impresses due to its doffing without underwinding, optimum process reliability and short doffing times. The integrated individual spindle monitoring system (ISM) ensures a high level of machine efficiency and can save about 5% of personnel costs. Selection of best suitable yarn depends upon the requirements of the final product. Rieter has comprehensively evaluated important criteria for yarn trader, weaver, and knitter. The best suitable yarn will support the quality of the final product and improve customer satisfaction. Com4® yarns spun on the Rieter spinning machines fulfill the most innovative requirements and ensure competitiveness in a dynamic market. Yarn characteristics are strongly depending upon spinning technology which is decisive for the yarn as well. Four different spinning technologies ring (non-compact), ring (compact), rotor and air-jet spinning create four different yarn types, i.e., Com4 ring, Com4 compact, Com4 rotor, and Com4 jet. Similarly, some of the manufacturers have developed their pre-spinning operation up to the mark to fulfill the demanding criteria of the customer. Trutzschler is an innovation leader in the blow room and card. Their installations convince in terms of well-known long service life, lower cost and low energy consumption. At the same time, the best possible use of valuable raw materials is also achieved. Intelligent technologies retrieve additional good fibers even from alleged production waste. This system contributes to environmental protection and resource conservation equally. Special yarns and use of recycled materials have attracted serious interest from the last few years. Improving comfort and quality of life through textiles, whether for industrial or fashion uses, has remained the focus of Perma Corporation Since 2016. The Thai producer of functional yarns in polyester and cotton/polyester blends has emerged as the international expert in Nano Zinc Oxide technology, which ensures that PERMA fibers have permanent antibacterial properties. This technical solution is environment-friendly and applicable to all stages of the textile industry from fiber to yarns and fabrics for all the markets, i.e., women, men, and children.

Similarly, high-performance biodegradable materials based synthetic yarns is also attracting the market. DuPont Sorona yarn and biodegradable filaments with antibacterial, anti-fire, anti-UV and quick-drying functionalities are capturing the high-tech textile markets. The BIOFIB™ range, made of polybutylene succinate polymers, is 100% biodegradable, making it possible to combine comfort, natural touch and strength all in one fabric.



New body temperature-regulating properties coupled with optimal comfort for all natural fibers is a promising reality at U.S. producer Cocona Natural Technologies. Their patented technology has made it possible to integrate active PCM particles in the yarns permanently and originally designed to meet the needs of sport and outdoor-wear. This technology has also found applications in casual and elegant fashions, for go-anywhere comfort and style.

UMORFIL® technology uses recycled materials and integrates ocean peptide amino acids at a supramolecular level in the fibers such as viscose, for a wide range of functional bionic fibers to provide skin-friendly comfort and softness that are perfect ingredients for active fashions, second-skin fabrics, and bedding. Likewise, the wide range of graphene oxide fibres and yarns developed by Kyorene Graphene fiber and yarn blends fabrics and materials antibacterial, deodorant, anti-moth/insect, UV protection, thermal regulation and therapeutic infrared-action properties, as well as mechanical stability and washing resistance, making them perfect for all industrial textile applications, as well as sportswear and athleisure. Adidas is planning to use plastic garbage floating on our oceans. Together with the non-profit organization Parley for the Oceans, the sports goods manufacturer developed sports shoes whose upper material is made up of 100 percent plastic residues from the sea. The raw materials for this are yarns and fibers obtained from recycled, processed waste and (illegal) offshore networks.

Novonic Zimmermann AG has developed a conductive, elastic yarn that can be integrated into textile fabrics or individual threads. The yarn can transmit data and is also capable of conducting heat and shielding radiation. The clever fabric is used for Handicapped mobile phone case and many other applications. This blocks the radio waves of mobile phones with the help of Novonic fabric. However, only on the body side of the wearer, so that the mobile radio reception remains guaranteed. There are thousands of other applications for Novonic. So far, however, the interest of the industry is still low. This may soon change in the dawning age of wearables.

## **Recent Technological Developments and Practical Solutions for Weaving Industry**

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There have been numerous technological developments in weaving during recent years. Picanol has introduced mobile connectivity in the weaving, by developing android apps (Picanol EasySet and Picanol Energy) The app starts from a Bluetooth connection with the weaving machine and give operators the possibility to follow-up the weaving process in detail and to intervene when needed. Th apps can be used to analyze and optimize the waste configuration of machine and the electrical and air usage. The Stäubli has introduced a Jacquard machine (UNIVAL 100) that offers virtually unlimited options to weave the technical fabrics in 3D weaving, especially using carbon fibers. Another Jacquard machine (Stäubli LXL) has enabled the production of one-piece woven (OPW) complex airbag structures with woven seams, offering great flexibility in creating patterns and designs. The TF weaving systems by Stäubli is considered to be a complete solution for weaving of high-performance technical textiles. This system features flexibility in terms of warp thread supply, shed formation, weft insertion, fabric take-off and allows individual configuration that meets any required specifications. The Dornier air-jet weaving machine for tire cord can process the yarn much faster than machines with mechanical insertion systems. The weaving machines from Dornier have also been used for flawless weaving of high performance fibers such as carbon, glass and aramid. In ITMA 2018 at Shanghai, Dornier exhibited its new P2 (TGP) rapier weaving loom that can bring a reed beat up force of up to 5 tons for producing high density fabrics. The JAT series of TOYOTA air-jet looms has focused on consistently air saving. For the latest model JAT810, they have modified the sub-nozzle, varying the air path. It has led to approximately 20% reduction in air consumption, as compared with the previous model JAT710. ITEMA introduced the second generation of its denim-dedicated rapier weaving machine, R95002 in 2018. The optimized mechanical components allow a considerable reduction in energy consumption, while iSAVERTM device eliminates the waste selvedge on the left-hand side of the fabric. Another machine by ITEMA, the R9500terry has the capacity to weave a heavy bath mat style to with the widest weaving width of 540cm. The Schönherr carpet weaving machines (ALPHA series) offer nearly unlimited binding possibilities, upto four ground weaves with cam motion and 50 ground weaves with dobby motion combined with several pile weave structures.

Any type of industry needs improvement and it is achieved due to "never ending efforts". The suggestions system was introduced by Dr. Deming who is the founder of quality control circles. QCC are the sources for collection of suggestions. Every person has many commentaries about his specialized field. As I have been mostly linked with the weaving industries for many years and taught the numerous courses so I would like to write some suggestions for improvement in the weaving process. The main improvement related to fabric manufacturing process may relate with production, yield and costing. These have the core values even in any type of process. I will recommend the following steps for the weaving industries:



- 1- The conversion costs are mainly related with maintenance, power, sizing and labor. These costs can be reduced by research and development so I will recommend establishing R & D departments/sections for these activities.
- 2- Yield is another important factor which can be improved by decreasing different types of wastages.
- 3- The recycling of the sizing material may reduce cost of sizing process which is not practice able even in the composite units
- 4- One ready made sizing material instead of many chemicals should be used for warp sizing.
- 5- The sizing is heart/core of weaving process, so it is necessary 100 % inspection and testing for this critical process.
- 6- Wastages are not monitored as should be, so I would recommend monitoring the wastages on daily basis and some corrective measures should be taken.
- 7- Skilled labor is equally important for effective maintenance to reduce the un-necessary stoppages, rejection and wastages, so training of all levels of employees should be ensured periodically.
- 8- Sharing problems is half solution for any kind of problem so administrative as well as technical staff should sit together to share the problems of their respective areas.
- 9- Quality control department should be independent and reporting to Chief Executive of the Mills.

## **Knitting: The Need of Time**

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In ancient times, someone foresighted formation of fabric by use of two pointed sticks with manipulation of yarn in multiple interconnected loops. This was basic formulation of modern day knitting. Knitting is popular hobby irrespective of age group although it was associated with grandmothers only in past.

Life in today's world cannot be imagined without the knitted textile. Knitted products are very popular and integral part of textile material. Knitting is the process of forming fabric by inter-looping of yarns. Knitting is the second largest and most growing technique of fabric manufacturing. Knitting is a fundamental component of traditional textile industry. Due to the exceptionally good property of knits like excellent elasticity, light weight, natural softness, and conformability and due to highly developed and economical production of knitted fabrics a major segment of world market is captured by knitted products. Pakistan holds an important position in global textile. Textile exports are 58 percent of total nation's export, providing 40% employment and 8.5 % share in GDP. Although World export of textiles is USD 327,200 million in 2017, where Pakistan export is just USD 7,132 million. Pakistan's textile export share in global market is just, 2.18 %, whereas China is leading with share of 34.36 %. Despite remaining under pressure from its competitors mainly Bangladesh and India, knitwear (hosiery) sector, being the largest foreign exchange earner as well, the largest contributor in the textile and total export of the country. During the first five months of current financial year the knitwear exports from the country increased by 10.58 percent as compared to the exports of the corresponding period last year. Knitwear worth USD 1.214 billion which is about 52,171 thousand dozens were exported during the period from July –November 2018 as compared to the exports of 43,388 thousand dozen valuing USD 1.098 billion of same period last year. The exports of ready-made garments during the last five months had witnessed 0.28 percent growth as compared to the corresponding period of last year.

Virtually every knit structure falls into one of two primary categories commonly referred to as either a weft knit or a warp knit. These two types are differentiated by the movement of yarn in fabric formation. If the yarn moves in the width of the fabric or in cross wise direction perpendicular to the length of fabric or direction of fabric formation then it is known as Weft Knitting. If the direction of yarn propagation is in length wise of fabric or parallel to the direction of fabric formation then it is known as Warp Knitting as shown in Figure 1. The knitted fabrics are made with two different type of techniques and the fabrics made with these techniques also have different characteristics, due to this reason the application area of knitted fabrics is also extended to many folds.

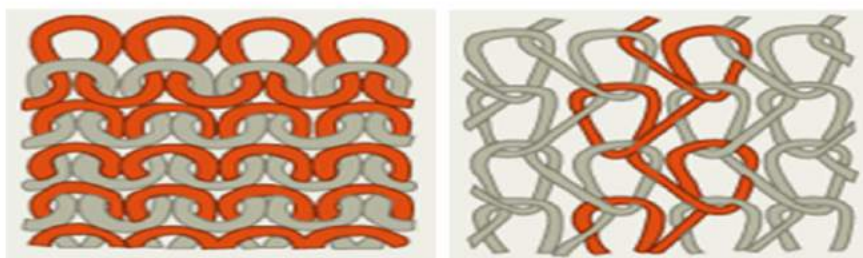


Figure 1 Weft and Warp knitting yarn propagation



Weft knitted fabrics are softer, flimsy and thick fabrics in comparison with warp knitted fabrics. Weft knitted fabrics are mainly used in clothing. Main products of weft knitted fabrics are T-shirts, polo shirt, trousers, sweaters, knitted scarf, undergarments, socks, gloves, table cloths, mats. Beside apparel uses, knitting is also commonly used in technical applications due to distinct characteristics of its structure. Weft knitted fabrics are used as upholstery, knitted blankets, medical stockings, bandages, geo applications and protective textiles. The 2D and 3D knitted structures are widely used in technical applications. Easier to produce than woven fabrics. As it is known that yarn used for knit fabric needs no preparations like warping and sizing, yarn can be directly feeded on machine after receiving from spinning mills. Knitted fabrics are made from different types of yarn, of different yarn fineness, composition of the raw material and different structures. Knitted fabrics have received much consideration in latest years in the textile composite field due to their outstanding formability. The sports goods are used worldwide not only in the field but also out of field with changing trends. The sportswear has certain qualities in it due to which it has become more popular in daily life. Knitted fabrics don't restrict the body movement, are more versatile and easier to use as well. The reason behind the flexibility of knitted fabrics is intermeshing of loops which restrict the yarn to only few places. The woven structures unlike the knitted structures are interlaced so movement of yarn is rather difficult that's why less comfortable and breathable.



Figure 2 Some of the Knitting Applications

In automobiles the applications of knitted structures are in two ways, 1<sup>st</sup> is for non-load bearing applications and 2<sup>nd</sup> is for load bearing applications in composites. Mostly conventional knitted structures are used in non-load bearing applications like interior design. While after certain modification the knitted structures can be used for load bearing applications like wheel hose. The knitted medical textiles including artificial blood vessels, hernia patches, compression bandages, vascular prosthesis, surgical hosiery, blankets, wound dressings, stockings, elasticated net structures and expandable metallic stents etc. The knitted medical textiles have replaced in large number the synthetic medical products made of rubber, foam, latex and other laminated structures. The knitted medical textiles are made with both warp and weft knitting. Obviously, weft and warp knitting can, and does, get much more complicated depending on the application and its end-use requirements. Knitting technology continues to evolve and improve.

Pakistan knitwear (hosiery) industry is playing a vital role in value addition of textile sector. There is a great potential of further development in this industry as there is substantial value addition in the form of knitwear apparel, sportswear, socks, compression garments etc. It deserves attention to diversify knitwear products to bring more innovations and incentives to boost its exports. As data source by TechNavio Analysis, global technical textiles markets is expanding and predicted to grow 4.17 percent in 2019.

## Global Trends in Nonwovens

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The people become familiar with the term 'nonwoven' in the late 1940s when nonwovens were often considered as cheaper substitutes for traditional textiles and were generally made from carded webs using converted textile processing machinery due to partial or complete elimination of conventional operational processes like spinning, weaving, knitting, etc. The nonwovens industry became commercially viable in the United States and in Europe during 1970s and a bit later in Japan and elsewhere. INDA, North America's Association of the Nonwoven Fabrics Industry, describes nonwoven fabrics as 'sheet or web structures bonded together by entangling fibres or filaments, by various mechanical, thermal and/or chemical processes.



Nonwovens, on the basis of their functionality, can be categorized into two main sections: disposable and durable. The few examples of disposable nonwovens include diapers, feminine hygiene, adult incontinence products and wipes and among durable nonwovens, include filters, automotive carpets, upholstery fabrics, road underlay, weed control and insulating fabrics etc. The global market size of nonwovens was USD 37 Billion in 2014 and is estimated to grow from USD 42.3 Billion in 2017 to USD 57.4 Billion by 2022, as compared to textile and apparel market of approximately USD 900 Billion, with a projected annual growth rate of 6.3% as depicted.

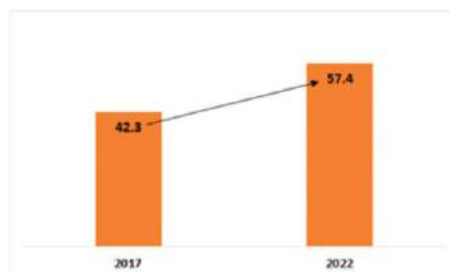


Figure 1 Global Nonwovens market value, USD Billion (Source: Smithers Apex)

Among various techniques such dry-laid, air-laid, wet-laid and spun-laid, the latter is most widely used technique for manufacturing nonwoven fabrics. However, dry-laid nonwovens are projected to grow at the highest compound annual growth rate (CAGR) from 2017 to 2022 due to their wide applications in wipes, personal care, construction and packaging products. This growth may be attributed to the rapid urbanization and the rise in disposable income levels. Manmade fibres completely dominate the nonwovens industry accounting for more than 90% of global consumption in nonwoven products. Among them, polypropylene (PP) was the single largest raw material used for global nonwovens in 2015 and will also hold the major volume share of the market in 2020. Figure 2 shows the raw materials split for global nonwovens in 2015. PP nonwovens find diverse applications ranging from lightweight and disposable hygiene products to durable and strong geotextiles and construction materials owing to their greater strength, durability and flexibility when compared to other nonwovens made from polyester, nylon, and cellulose-derived fabrics. The PP nonwoven fabrics market has more growth potential in the emerging regions like Asia Pacific due to high demand for hygiene products such as baby diapers and feminine hygiene products.

In 2016, the Asia Pacific region was accounted for the largest share of the global nonwovens market, in terms of value and volume, followed by the Middle East, Africa, North America and Europe. This region is estimated to be the largest consumer, globally, owing to the commissioning of additional capacities, as well as increase in the production of nonwoven fabrics in the region as shown in Figure 3. China is expected to be the key market in the region (Figure 4), followed by Japan, India, Korea, Australia and others. China held the largest share globally in terms of production and consumption (27%) of nonwovens in 2017. Moreover, the demand for nonwovens in China is estimated to increase by 6.9% per year to 4.9 million metric tons in 2022. The developing economies in the region such as Pakistan, India, Indonesia and Philippines etc. require durable nonwovens in the construction sector for applications in house wraps, roofing materials and geotextiles etc. Nonwoven fabrics are required in large quantities for applications in disposable products such as baby diapers, adult incontinence and feminine hygiene products. They are also required in medical and surgical products, filtration products and wipes etc. With such an increasing construction activities and large applications in the healthcare sector, the demand for nonwoven fabrics is expected to grow at a great pace in the region. Higher domestic demand along with the availability of low-cost labor, makes this region the most attractive market with nonwoven fabric producers. Additionally, rising disposable incomes and willingness to spend on such products further augment the nonwoven fabric market.

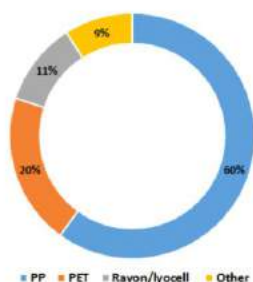


Figure 2 Market share of raw materials for nonwovens, 2015 (Source: Smithers Apex)

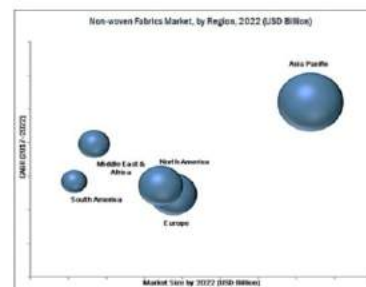


Figure 3 Nonwovens market by region



## Trends of Polymer Industry in the World

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The polymer industry has been a story of success over the past 30 years. The period since 1983 has seen world demand grow from just over 45 million tons to an expected market demand of over 250 million tons for 2014. The demand for polymer is controlled by advancement in end use markets, such as plastic, textile, packaging, automotive and structural application mainly from emerging economies. The worldwide market for industrial plastic packaging, estimated at USD 48.6 billion in 2013, is forecast to reach USD 61 billion by 2020, according to a recent market study. Polymer materials are continuously substituting metals, paper, natural fibers, glass, and other traditional materials in various applications due to its lightweight and strength and the design flexibility they offer to brand owners along with low-cost. Thermoplastics polymers are likely to witness the maximum growth over the next five years. Increasing applications of polyolefin in packaging and automotive are driving the demand of the thermoplastics segment. Growing uses of engineered plastics in various fields, such as automotive, construction, aerospace and industrial manufacturing equipment to mechanical engineering is expected to drive this market.

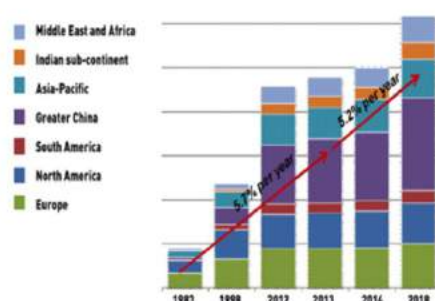


Figure 1 Global polymer demand growth 1983-2018

Figure 1 shows a continuous rise in the global demand of polymer. Constant technological developments in commercial expansion of polymers with improved properties and processing characteristics at competitive prices for most applications will be the key factor to future growth. Dow Chemical Company, BASF, Saudi Basic Industries Corporation (SABIC), China Petrochemical Corporation, and Exxon Mobil Corporation are some of the major suppliers of polymers. Now a days, China is the largest market for polymers in the world with a share of 29%, compared with 6% in 1983. Definitely, it became the world's largest market for polymers as far back as 2002. Meanwhile, other parts of the world are likely to accelerate moving forward. Africa provides huge potential due to its vast population, fast economic growth and considerable natural resources. Although South America has long been regarded as a region of considerable potential for strong growth, particularly Brazil. Europe is expected to be the region showing the slowest growth overall. The strongest growth is predicted to occur in the Pakistan-India, a region which has a population greater than that of China but with a polymer demand that is currently one-fifth of the size. This region also faces many challenges, particularly with regard to its infrastructure, technical capabilities and global competitiveness. Strong economic growth is required in rising living standards and increasing consumption of consumer goods from packaged foods to automobiles. Investment in infrastructure and agriculture will also be significant in driving the plastics industry in the region.

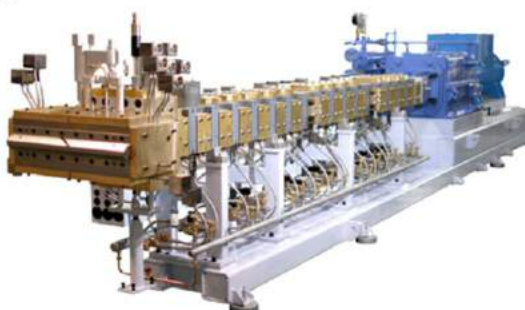


Figure 2 Extruder for Polymer Compounding



Presently there are 6000 plastics processors in Pakistan. The industry contributes around Rupees 8 billion annually to the national exchequer by way of custom duty, sales tax and income tax. Major concentration of plastics processors whether they are injection, blow, extrusion, woven or tubular films manufacturers, is in and around the industrial hubs of Karachi, Lahore, Gujranwala, Peshawar, Faisalabad, Hyderabad, Rawalpindi, Gadoon and Hattar. Technological advancement and new product developments at competitive prices are likely to be key factors for future growth.

## Technical Innovation in Polymers

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In the present era, we are surrounded by polymer products. Polymers have been widely used in many applications from house hold product to hi-tech applications like aerospace, automotive and defense. The first polymer made was an elastomer it came into being during world war I due to ceased supply of natural rubber from that stage to today's stage there have been drastic advancements in this field.

When we talk about polymers we are not just talking about plastics instead there are many more products to ease our life and to take technology to next level. Polymers are affordable, efficient and smart, that's the reason of their popularity. Advanced polymers are one of the most exciting technologies in chemistry today. Suitable for a wide range of applications, polymers are literally the building blocks of our lives; they provide support, structure, and durability to thousands of products we interact with each and every day. Advancements in polymer technology have the potential to revolutionize medical treatment, space travel, fuel consumption, and more. For instance when we talk about energy storage devices most of them are polymeric materials like batteries solar cells and fuel cells are part of polymers. The solar energy industry is growing at a rapid rate, and new technologies keep popping up that improve efficiency and reduce costs. There are many different types of solar cell technologies. One type, known as plastic, organic or polymer photovoltaic solar cells, uses conductive organic polymers or organic molecules to absorb light, transfer the charge and produce electricity. This type of solar cell is lightweight and affordable, but requires very careful processing so the materials used mix and crystallize properly into thin films. There are few example of polymer in everyday life e.g. Polyethylene is used in plastic bags and film wraps. Polyvinyl Chloride (PVC) is used in siding, pipes, flooring purposes. The synthetic polymer, Polystyrene is used in cabinets, petri dishes, CD cases, plastic cutlery and in packaging. Polyvinyl acetate is used in adhesives and latex paints.

### Multi-Functional, Self-Healing Hydrogel:

A hydrogel (a water-swollen, 3-D polymer) with intrinsic "self-healing" capabilities as well as additional functionality such as electro conductivity. Scientists have developed a new way to create mechanically stable, conductive polymer hydrogels. A chitosan (DCh-PPy) polymerizes acrylic acid using iron atoms to create a double-network hydrogel; the iron also contributes to exceptional self-healing properties. The new material takes only minutes to "heal" completely when cut, and in addition to providing extreme conductivity, it is flexible and highly pressure-sensitive. Self-healing, electro conductive materials have long been seen as the Holy Grail of adhesive medical technology. Industries like construction, digital technology, and aeronautics are also highly interested in self-healing adhesives that crosslink physical and mechanical properties.

**Super Glue:** Researchers are studying the potential of a new glue made from cyanoacrylates that have been diluted with a non-solvent. When exposed to a surface containing water (such as a hydrogel), the glue becomes "triggered" to polymerize by the water, effectively entangling polymer chains with the attached material.

Clothing, floor coverings, garbage disposal bags, and packaging are other polymer applications. Automobile parts, windshields for fighter planes, pipes, tanks, packing materials, insulation, wood substitutes, adhesives, matrix for composites, and elastomers are all polymer applications used in the industrial market.

Every day, advancements emerge in polymer technology providing endless new opportunities for scientific and commercial study. Polymers are the future.



## Limitations and Opportunities for Composite Industry in Pakistan

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Textile Composites are the advance materials made using a combination of textile and polymers. These are one of the most value-added products of technical textile with applications in sports, medical, automotive, aerospace, and structural products. The current global market of textile composite is worth 100 billion USD in comparison to 135 billion USD for conventional technical textiles. The progress in the domain of textile composites has been revolutionary and its market size is expected to reach 130 billion USD by 2024. The annual growth rate of Chinese composite industry is 15% annually followed by 10% for Indian industry and 4% for European and American industry.

### Composites in Pakistan

In Pakistan, 120 to 150 small and medium sized organizations related to composites are operating. The major portion of existing industry is currently focused on sports equipment (hockey sticks, rackets etc.), fibre glass products (sheds, door panel tanks, low cost houses, brief cases etc.) and other low-end applications. The industry focusing on high-end applications i.e. defense and aerospace is very small. The currently focused products in these domains include rockets, unmanned aerospace vehicles (UAV), boats, bullet/blast proof vest, check posts etc. The overall exports of Pakistan composite industry are only worth 7.5 Million USD which is far below the potential.

### Opportunities

There is a great opportunity for the Pakistan composite industry in the field of aerospace and automotive. Project AZM, a highly ambitious project for the development of the next generation fighter plane is an opening for the application of high-performance composites. Meanwhile the automotive industry of Pakistan is also expanding with new manufacturers. According to the statistics of Pakistan Automotive Manufacturers Association, the total sales of passenger cars was 104,038 during the year 2018. Being focused on low cost, the automobile industry of Pakistan uses very few composite parts as compared to international practices. So, it can be a major area to focus for the composite industry.

### Limitations

The major limitations of Pakistan composite industry are the unviability of trained human resource, lack of R&D facilities, limited knowledge of advance technologies and rare participation in International exhibitions and fairs. Another limitation is the lack of sophisticated machinery used to fabricate parts for high-end applications. Majority of products are manufactured by hand layup, compression or simple infusion. Therefore, the parts fabricated are of low-end application. The availability of high-performance materials is also a constraint in the development of the composite industry in Pakistan.

### National Center for Composite Materials

The National Center for Composite Materials (NCCM) was established in April 2018. The objective of this center is to promote the composite materials industry in Pakistan by helping them to overcome their limitations. The main activities of the center are to help existing industry through R&D, testing and prototype development as well as to establish new startups. Multidisciplinary teams of faculty, research professionals and graduate and undergraduate research assistants perform basic and applied research. Activities range from creating new concepts and technologies to inserting those elements in new products and applications. Drivers for the research span the short-term needs of small businesses to the longer-term objectives of major industry and government programs. Companies of all sizes currently benefit from our commitment to technology transfer, which provides them with new ideas, new technologies, problem-solving capabilities, and access to potential employees with the capability to make immediate contributions.





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