

Curriculum Vitae

Dr Zaffar M. Khan

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PROFILE:

A creative aerospace and mechanical engineer with specialization in composite materials and smart structures having extensive track record in quality teaching, innovative research and professional services in US, China and Asia. Having taught academic courses in 3 M's ie Mechanics, Materials and Manufacturing in diverse environments, I have pursued multi-disciplinary research about design for manufacturing, structural health monitoring and additive manufacturing in collaboration with engineering industries. Several externally funded research programs about development of all composites structural systems were completed using innovative processes. I am adept at determination of industrial requirements, formulation of research projects and attracting research funding. I possess strong communication, mentoring and entrepreneurial skills for teamwork.

EDUCATION:

- Postdoctoral Research as Fulbright Scholar; Characterization of Layer Waviness Defect in Carbon Fiber Composite Materials by Fiber Optic Sensing and Mechanical Testing.
Iowa State University of Science and Technology, Ames 50011, USA, Aug 1995-Feb 1997.
- PhD, Aeronautical and Mechanical Engineering; Machining of Carbon Fiber Composite Materials.
Salford University, Manchester, UK in collaboration with British Aerospace. Oct 1988-Sep 1991.
- MS, Aerospace Engineering, Solid Mechanics (design, analysis and manufacturing of composite material)
Wichita State University, Kansas 67208, USA, Aug 1988-May 1988.
- B.E., Aerospace Engineering, Development of Converging Diverging Rocket Nozzle, National University of Science and Technology (NUST) College of Aeronautical Engineering, Risalpur, Pakistan.

PROFESSIONAL DEVELOPMENT PROGRAMS AND TRAININGS:

- Hypersonic Vehicles Structures, Materials and Propulsion, (AIAA online course)
- Polymer Nanocomposites, SAMPE Tutorial , Prof. Koo, Long Beach, CA.
- Composite Design (Grade: A), Professor Stephen Tsai, Stanford University, CA.
- Engineering Design Optimization, Professor Kamran Iqbal, University of Arkansas, Arkansas
- Optic Fiber Sensors & Smart Structures, Professor Eric Udd, Portland University. Oregon.
- Guidance, Navigation and Flight Mechanics of Aerospace Vehicles, Iowa State University.
- Industrial Composites Design and Applications, Professor Mariani, ICST, Trieste, Italy.
- Surfaces in Engineering Materials, Professor J. T. Grant, University of Dayton.
- Light RTM Close Mold Technology, Composite Manufacturing Technology Center, Cornwell, UK.
- Composites Mechanical Testing and Processing, SAMPE Tutorial , Prof. Dan Adams, Long Beach, CA.

EXPERIENCE (Research, Teaching and Services):

- **Visiting Professor**, Aug 2016 - Dec 2016, (Fall 2016 Semester), <https://www.winona.edu/>.
Department of Composite Materials Engineering, Winona State University, MN 55987, USA
Taught undergraduate courses regarding Senior Design Project and Engineering Statics based on outcome based learning to meet ABET requirements. Actively carried out student's mentoring, advising and counseling. Involved in scholastic activities i.e. 3D additive manufacturing and mechanical testing.
- **Professor (Materials and Mechanics)**, Dec 2020-Present, <http://www.uotnowshera.edu.pk>
Department of Mechanical Engineering, University of Technology, Nowshera, Pakistan,
Academic, research and administrative management

- **Professor (Materials and Mechanics) and Director**, Sep 2013-Aug 2016 and Jan 2017-Dec 2020
Professor; Department of Aeronautics and Astronautics and Director; Office of Research, Innovation & Commercialization (ORIC), Institute of Space Technology (IST), Islamabad, Pakistan & Visiting Professor; Department of Materials Sciences, Nanjing University of Aeronautics and Astronautics (NUAA), China.

Presently teaching graduate courses about Mechanics of Composite Materials, Advanced Structural Analysis, Stresses in Plates and Shells and supervising graduate research regarding In Situ Structural Health Monitoring by 3D printed piezoresistive carbon nanoparticle strain sensors to predict structural failure in collaboration with NUAA. Pioneered ORIC to promote commercialization of research from laboratory to launch, student's startups, enterprise development and innovative research having societal impact. Established student chapter of SAMPE and Innovation Laboratory (i-Lab) to develop prototype of structural components through 3D additive manufacturing by FDM and electro spinning processes.

- **Industry/ Visiting Professor* and Founding Director[#]** Nov 2001- Aug 2013.

*Department of Mechanical Engineering, University of Engineering and Technology, Taxila, Pakistan.

*National University of Sciences and Technology, Islamabad, Pakistan.

*Institute for High Energetic Materials, Monash University, Australia.

[#]AERO Composites, Advanced Engineering Research Organization, Wah Cantt, Pakistan.

*Taught project based and research led academic courses about design, mechanics and manufacturing of composites and supervised research about physical, mechanical characterization of polymer composites. Supervised PhD/ MS research about structure-property relationship, post curing and manufacturing of composite materials in collaboration with North West Composite Center, Manchester University, UK.

[#]Developed structural systems of aircrafts, automobiles and wind mill blades i.e. air intake, radom, wings and exhaust scoop from carbon, glass and Kevlar fibre reinforced composite materials and foam/ nomax sandwich structures. This involved material selection, process optimization, thermal measurements, mechanical testing and prototype development as part of academia-industry collaborative program.

- **Associate/ Assistant Professor and Founding Chair**, Jun 1, 1992 - Nov 07, 2001.

Department of Mechanical Engineering, College of Electrical and Mechanical Engineering, National University of Sciences and Technology (NUST), Islamabad, Pakistan,
<http://www.nust.edu.pk/Pages/Default.aspx>.

Launched split graduate program in mechanical engineering in collaboration with Michigan State University, US. Taught courses related to Solid Mechanics and Composite Materials. Organized workshops about design, mechanics, manufacturing and processing of composites. Developed graduate programs in Aerospace Engineering in collaboration with Iowa State University. Carried out R&D about cost effective composites manufacturing and ballistic body protection in collaboration with DuPont, US and Ares Protection, France. Established student chapter of Society of Experimental Mechanics (SEM).

- **Visiting Professor**, Aug 24, 1995 – Feb 1, 1997, <https://www.iastate.edu/>

Department of Aerospace Engineering & Engineering Mechanics, Iowa State University, USA

R/D about real problem area of NASA Langley; Assessment of layer waviness defect in carbon fibre composite laminate by mechanical testing and fibre optic sensors. Taught course (partially); Mechanics of Composite Materials and supervised laboratory experiments; Fiber Optic Smart Structures.

- **Part time Lecturer/ Teaching/ Research Assistant**, Oct, 1988 - Sep 1991, <https://www.salford.ac.uk/>

Department of Aeronautical & Mechanical Engineering, Salford University, UK. Supervised laboratory experiments in Solid Mechanics, extended teaching assistance in Engineering Drawing.

FELLOWSHIPS, AWARDS AND SCHOLARSHIPS:

- Fulbright Postdoctoral Research Award, US Education Foundation, Washington DC.
- NSF Award to attend Fiber Optic Smart Structures Workshop, Portland University.
- Blackburn Award for PhD research with British Aerospace by Royal Aeronautical Society, London.
- Islamic Development Bank Postdoctoral Research Award, Islamic Development Bank, Jeddah, KSA
- Thomas Jefferson Award for MS studies by US Agency for International Development, Washington.
- Ministry of Science & Technology Award for PhD/ MS studies, Government of Pakistan.
- Honorary Fellow Australian Institute of Materials, Monash University, Australia.
- Name on HONOUR WALL, American Institute of Aeronautics & Astronautics, Washington DC.
- Best Technology Award for developing 3D Additive Manufacturing Process by Fusion Deposition Modeling in Invention Summit, CECOS University, Peshawar, Pakistan.

COMMENDATION CARDS/ APPRECIATION LETTERS:

- Development of 1st all composite airframe system of an Unmanned Aerial Vehicle by DG, AERO.
- Development of 1st all composite airframe system of Autonomous Aerospace Vehicle by DG AERO.
- Development of 1st all composite body of Shell Eco Marathon Car for GIKI, Rector GIKI, 2010.
- Development of 1st all composite body of Society of Automotive Engineer's Formula-1 Car, 2012.
- Development of Ballistic Vehicles Protection Systems, Chief of Air Staff, Pakistan Air Force, 2010.
- Organizing 1st international PAK-ASEAN Conference, 'Industrial Composites', Rector NUST, 2003
- Pioneered academic collaborative with Iowa State University, US Senator Tom Harkin, 1996.

ACADEMIC ESTEEM INDICATOR:

- Member of Review Panels: (i) Journal of Intelligent Material Systems and Structures (ii) Carnegie Metallurgical & Materials Transaction, (iii) Journal of Composite Materials, (iv) Polymer Engineering.
- Pioneered successful academic collaborative program in aerospace and mechanical engineering with Iowa State University and Michigan State University; appreciation letter, Senator Tom Harkin.
- Member of Consultation Committee of International Development Strategies for College of Materials Science and Technology, Nanjing University of Aeronautics and Astronautics, China.
- Member of Board of Advanced Studies, Research and Technology, UET, Taxila
- Member of National Research Program for Universities (NRPU), Advanced Materials.
- Member of Fulbright Fellowship selection panel in Science and Technology

COMPOSITE CONFERENCES/ WORKSHOPS/ EXHIBITIONS ORGANIZED:

<http://www.jeccomposites.com/news/composites-news/pakistani-institute-space-technology-introduces-its-composite-material-technolo>

- Challenges to Composite Materials in Digital Manufacturing Environments (Industry Level 4), 4th Annual Developers Conference, Institute of Space Technology, Islamabad, Pakistan. Oct 26, 2019.
- Design and Analysis of Advanced Composite Materials, Institute of Space Technology, Islamabad, Pakistan in collaboration with Darby University, UK, April 17-20, 2019, www.ist.edu.pk/cacs
- Engineering Design Optimization, University of Arkansas, Little Rock, US and Institute of Space Technology, Islamabad, Pakistan Joint Conference, Aug 01-09, 2018.
- Advanced Composites Design, Analysis, Manufacturing and Processing, Institute of Space Technology, Islamabad, Pakistan, Oct 2017 and Nov 2017
- Composites Design and Analysis, Department of Materials Sciences, Nanjing Institute of Aeronautics and Astronautics, Nanjing, China, 13-17 Nov, 2015.
- Drilling Induced Failure Modes in Carbon Epoxy Composites, Materials, Structures and Mechanics Department, Michigan State University, East Lansing, MI, USA, Jul 1996.
- Cost Effective Composites Manufacturing in collaboration with PUM, Netherland at Institute of Space Technology, Islamabad, 24 Feb – 8 Mar, 2014.

- Composites Design, Analysis and Optimization using NASTRAN/ PATRAN in collaboration with Composites World at Institute of Space Technology, May 27, 2014.
- 10th, 9th, 8th, 7P^{thP} & 6P^{thP} International Bhurban Conferences on Applied Science & Technology (Advanced Composite Materials), Jan 2013- Jan 2009, <http://ibcast.org.pk/org.htm>.
- International Workshop on Composites in Ballistics, sponsored by DuPont, USA at NUST College of E&ME, Peshawar Road, Rawalpindi, Pakistan, 1998.
- 4 National Workshops, Composites Design-for-Manufacturing at NUST College of E&ME, Peshawar Road, Rawalpindi, Pakistan, 1999, 1995-1993.
- Pak-ASEAN International Workshop, Industrial Composites Design & Applications, Pakistan, 2002.
- Pakistan Composites Show, Islamabad Hotel, Islamabad, Pakistan.
- Hanover Industrial Exhibition about Industrial Automation and Control, Germany, April 2017

MEMBERSHIP OF INTERNATIONAL PROFESSIONAL BODIES:

- Membership Society for Advancement of Material & Process Engineering
- Membership American Institute of Aeronautics & Astronautics.
- Canadian Association of Composite Structures and Materials (Needs renewal)

COMMUNITY SERVICES/ INVOLVEMENT:

- Organized Hertz Prize award for commercialization of research endorsed by Bill Clinton, 2019, 20.
- Established student chapter of SAMPE, Institute of Space Technology, Pakistan.
- Established student chapter of Society of Experimental Mechanics (SEM), National University College of Electrical and Mechanical Engineering, Peshawar Road, Rawalpindi
- Member of Fulbright Selection Committee, United State Education Foundation, Islamabad
- Registered Professional Engineer- Pakistan Engineering Council.
- Executive Committee-Pakistan Materials Research Society.
- National Steering Committee-Advanced Materials.
- COMSTECH Expert Group on Engineering Materials
- Sectorial Committee on Future Technologies, Higher Education Commission.

FUNDED RESEARCH AND TECHNOLOGY DEVELOPMENT PROJECTS:

<u>S#</u>	<u>Project name</u>	<u>Brief Description of Innovation</u>	<u>VALUE (\$)</u>
1.	Design for Manufacturing of Structural Systems of High Performance Aerospace Vehicles:	Structural design, manufacturing, testing and qualification of aerospace structural systems i.e. aeroelastic wings, fuselage, nose cone, air intake, tail plane of pusher type, canard configuration UAVs, air launched aerospace vehicles from advanced composite materials using affordable non-autoclave technologies, (RTM, VARTM, Pultrusion).	2.5 MILLION
2.	All Composite Bodies of Automotive Vehicles	Shell Eco and Formula-1 SAE automobile car bodies were developed from carbon-epoxy composites skin and nomax/ foam sandwich floor using single step resin infusion process for GIK Institute of Science & Technology, NUST and NED Universities. Research published in conference proceedings of 42 nd SAMPE Technical Conference, Salt Lake City, USA.	0.25 MILLION
3.	Ballistic Body and Vehicle Protection	Accelerated research sponsored by DuPont as part of graduate and UG research at National University led to development of 1 st prototypes of bullet proof jacket and PASGAT helmet. Commercialization of project led to production of 5,000 bullet proof jackets and protection of 20 vehicles having NIJ standards III,	0.75 MILLION

4.	Development and Rehabilitation of Radoms	IIIA for Homeland Security, Scouts, Rangers, Army. Aircraft radoms having axi symmetric electromagnetic loss (<1 Db) were developed from glass-epoxy composites. Ten Lockheed C-130 aircraft nomax sandwich radoms were repaired/ tested using Wichitech Heatcon Composite Repair System.	0.25 MILLION
5.	Wind turbine Blades	Affordable fabrication, testing, characterization of wind turbine rotor blades, diameter: 2.4 meter according to NACA aerofoil profile 4527 from glass fiber reinforced vinyl ester matrix composites.	0.15 MILLIOM

INDUSTRIAL CONSULTANCY/ ADVISORY SERVICES:

- Insulation Materials Industries under China-Pakistan Economic Corridor Program, The Academic Conference and Exhibition of China Insulation Materials Industries, Nanjing, China, 2018.
- Composite Product Development by Polyurethane Resin Injection Pultrusion System, Thai Composites Industries, Bangkok, 2015.
- Ballistic and Electromagnetic Protection using Composite Materials and Sandwich Structures, Homeland Security Services, Pakistan, 2008-2013
- Composite Product development, Advanced Materials Research Center, Berhad, Malaysia, 2005.
- Development of all Composite Sports goods from Carbon Fiber Composite Materials, Prefeasibility Report, UNCSTD/ Ministry of Science and Technology, Pakistan, 1993.

PHD/ MS RESEARCH THESIS SUPERVISED:

<u>S/#</u>	<u>PhD*/ MS Research Thesis supervised/ co-supervised/ reviewed</u>	<u>University</u>	<u>Year</u>
1.	Additive Manufacturing of Flexible Strain Sensor for Structural Health Monitoring of Smart Aerospace Structures.	IST	2021
2.	To determine the Effect of Graphene on Mechanical Properties of Sandwich Panels.	IST	2020
3.	Design and Analysis of Aerospace Composites using CNP based Screen Printed Sensors.	IST	2018
4.	2D Nano sheets Polymer Composites Mechanical and Electrical Properties Evaluation and Application*.	NUST	2016
5.	Characterization of Self-Healing Composite Materials*.	NUAA, China	2016
6.	Online Structural Health Monitoring of Composites by Piezoresistive Nanosensors*	UETT/ Bolton University, UK	2015
7.	Synergistic Enhancement in Mechanical and Ballistic Properties of Composite Propellant for Solid Propulsion System.	NUST	2014
8.	Ablatives Based on Multiple Reinforced Elastomeric Composites for Aerospace Applications*.	NUST	2013
9.	Design, Fabrication and Analysis of Photonic Devices Nanostructures*.	NUST/ Univ. of E. Finland	2013
10.	Design and Fabrication of Laboratory Scale VARTM,	NUST	2012
11.	Radar Absorbing Nanomaterials.	NUST	2011
12.	Fabrication of Windmill Rotor Blade using FRP.	NUST	2010
13.	Mechanical Characterization and FEM of Sandwich Structures.	NUST	2009
14.	Fractographic Analysis of Failure Modes of Carbon Fiber Composites	Air Univ.	2008
15.	Mechanical Characterization of Advanced Composite Materials	NUST	2006
16.	Stress Analysis of Composite Materials under Impact Load	NUST	1999
17.	Stress Determination in Composite Structures	NUST	1996
18.	Cost Effective Composite Manufacturing	NUST	1994
19.	Design and Development of Composite Structural Components	NUST	1994

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| 20. | Ballistic Body Protection using Composite Materials | NUST | 1998 |
| 21 | Development of Automobile Bumper using Composite Materials | NUST | 1992 |

EDITOR/ CONTRIBUTIONS TO COMPILED VOLUMES [REFEREED]:

- Contributed Chapter # 2, 'Multifunctional Polymer Nanocomposites in Next Generation Smart Structures', book title: 'Development and Prospective Application of NanoScience and Nanotechnology' published by Bentham Science Publishers for Center of Advanced Materials, King A.A. University, Saudi Arabia, Jan, 2016. <http://ebooks.benthamscience.com/book/9781681081779/>.
- Contributed Book Chapter # 4, 'Flow Induced Vibrations in Heat Exchanger tube Bundles: A review', Nuclear power Plants, Publisher: INTECH, ISBN 978-953-51-0408-7, 2012, pp 71-128.
- Editor Journal of Advanced Materials for Applied Science and Technology II, Advanced Materials Research Vol. 570, Trans Tech publication, Switzerland, ISBN-13: 978-3-03785-483-9,
- Editor Journal of Advanced Materials for Applied Science and Technology I, Advanced Materials Research Vol. 326, Trans Tech publication, Switzerland, ISBN-13: 978-3-03785-227-9, ISSN: 1022-6680, 2012, 2012.
- Editor Conference proceedings of 7th International Bhurban Conference on applied Science and Technology, ADVANCED MATERIALS, 11-14 Jan 2009, 2010. ISBN 978-969-8741-08-2.

REFEREED PUBLICATIONS: <https://scholar.google.com.pk/citations?user=Bu1zMCAAAAAAJ&hl=en&oi=a0>
Cumulative Impact Factor of Peered Review Research Papers: 60, Citations: 369, H-Index: 11

• **Peer Reviewed Journals:**

- Additive Manufacturing of Flexible Strain Sensor for Structural Health Monitoring of Smart Composite Materials. Ahmed, Sheraz; Nauman, Saad; **Khan, Zaffar**. Journal of Intelligent Material Systems and Structures JIM-21-158. Submitted for publication.
- Effect of Graphene on Mechanical Properties of Sandwich Panel for Aerospace Structures, Zainab Naseer and **Zaffar Khan**, Key Engineering Materials, Scientific Net, Vol. 875, Feb 2021. <https://doi.org/10.4028/www.scientific.net/KEM.875.121>
- Piezoelectric Pressure Sensor based on GO-modified P (VDF-TrFE) fibers for vacuum applications. Asim Shahzad, Zhaofeng Chen, Azhar Ali Haidary, Ahmer Mahmood and **Zaffar M. Khan**, Journal of Material Science, Sep 12, 2020 (Impact Factor: 2.1). <https://doi.org/10.1007/s10854-020-04405-4>
- Screen-printed nanocomposite sensors for online in situ structural health monitoring. TA Khan, S Nauman, Z Asfar, MA Nasir, **ZM Khan** - Journal of Thermoplastic Composite Materials, 2018, (Impact Factor: 0.912) <https://journals.sagepub.com/doi/abs/10.1177/0892705718805131>
- Liquid exfoliated graphene smart layer for structural health monitoring of composites, Rahim Jan, Amir Habib, **Zaffar M Khan**, Muhammad Bilal Khan, Muhammad Anas, Ali Nasir and Saad Nauman, Journal of Intelligent Material Systems and Structures, (IF 2.17). <http://journals.sagepub.com/doi/abs/10.1177/1045389X16672729>
- Ablation, thermal stability/transport/phase transition study of carbon nanofiber-reinforced elastomeric nanocomposites, Sadia Sagar Iqbal, Fawad Inam, Ali Bahadar, Arshad Bashir, Faiza Hassan, Bilal Khan, **Zaffar M. Khan**, Journal of Thermal Analysis and Calorimetry, Nov 24, 2017, Springer Netherland (IF: 1.95), <https://doi.org/10.1007/s10973-017-6831-1>.
- A Novel Processing Approach to Produce Microchannel Embedded Carbon-Epoxy Composite, Mohammad Umar Saeed, BinBin Li, ZhaoFeng Chen, **Zaffar Mohammad Khan**, Journal of Manufacturing Processes, 22 (2016)26-33 (Impact Factor: 1.885). <http://www.sciencedirect.com/science/article/pii/S1526612516000165>
- Fabrication and Thermomechanical Characterization of Glass Fiber/ Vinyl Ester Wind Turbine Rotor Blade, Umair Javaid, **Zaffar M. Khan**, M.B. Khan, M. Bassyouni, S.M.-S. Abdel-Hamid, M.H. Abdel-Aziz, Syued W. ul Hasan, Composites Part B (2016), (IF: 2.998) <http://www.sciencedirect.com/science/article/pii/S135983681600038X>

9. The Influence of Multiple Nested Layer Waviness on the Compression Strength of Double Nested Wave Formation in Carbon Fiber Composite Laminate, **Z. M. Khan**, D.O. Adams and S. Anis, *Mechanics of Composite Materials*, Springer Vol 51, No 6, pp 751-760, 2016 (IF: 0.437)
<http://link.springer.com/article/10.1007%2Fs11029-016-9546-7>
10. Smart Sensing Layer for the Detection of Damage due to Defects in a Laminated Composite Structure, Nasir, Muhammad; **Khan, Zaffar**; Shah, Masood; Asfar, Zeeshan; Nauman, Saad, *Journal of Intelligent Material Systems and Structures*, pp 1-7, 2014.
<http://www.sagepub.in/journals/Journal201582> (IF 2.17)
11. Muhammad Ali Nasir, Zaffar Khan, et al, "Density variation effects on cross dimension (CD) strength of Phenolic multilayered composites fabricated via VARTM", *The Nucleus* 51, No. 1, (2014)
12. Experimentally Determined Variation in Multilayered Composites Fabricated by Optimized VARTM Technology, Ali Nasir, **Zaffar Khan**, Saad Nauman and Saad Anis, *Composites: Mechanics, Computation, Applications*, 5(3), 1-12 (2014)
13. Transverse Shear Behavior of Nomax Core for Sandwich Panel, M. A. Nasir, **Zaffar M. Khan**, Ilyas Farooqi, Saad Nauman, Shahid Khalil, Asim Pasha, Zubair Khan, H. Qaiser, *Mechanics of Composite Materials*, ISSN: 0191-5665. Journal no. 11029, Vol 50, No 1, 2015 (IF 0.9).
<http://www.springer.com/materials/characterization+%26+evaluation/journal/11029>
14. Cost-effective manufacturing process for the development of automotive from energy efficient composite materials and sandwich structures, Laraib Alam Khan, Ali Hasan Mahmood, Bilal Hassan, Tahir Sharif, Shahaab Khushnod, **Zaffar M. Khan**, *Polymer Composites*, Volume 35, Issue 1, January 2014, Pages 97–104.
<http://onlinelibrary.wiley.com/doi/10.1002/pc.22638/abstract> (IF:2)
15. Influence of MWCNTs as Secondary Reinforcement Material in Glass Fiber/Epoxy Composites Fabricated Using VARTM, S. Anas, G. Ur Rehman, **Z.M. Khan**, N. Ul-Haq, M.B. Khan, S. Nauman, M. Shahid, and A.Nasir, *Applied Polymer Composites*, Vol. 2, No. 1, 2014.
<http://www.polymerjournals.com/AppliedPolymerComposites.asp>.
16. Design of carbon/glass/epoxy-based radar absorbing composites: Microwaves attenuation properties, Afzaal Ashraf, Mateen Tariq, Kashif Naveed, Ayesha Kausar, Zafar Iqbal, Zaffar M. Khan, Laraib A. Khan, *Polymer Engineering and Science*, Volume 54, Issue 11, November 2014, Pages 2508–2514. <http://onlinelibrary.wiley.com/doi/10.1002/pen.23801/full>
17. The Drilling Induced Failure Mechanisms in T800/ 924C Toughened Carbon Epoxy Composite Materials, **Zaffar M. Khan**, Laraib Alam Khan, Ahmed Shuja Syed, DOI: 10.1177/0731684413503510, *Journal of Reinforced Plastics and Composite*, Oct 8, 2013.
<http://jrp.sagepub.com/content/early/2013/10/07/0731684413503510.abstract> (IF 1.5)
18. Cure Characterization of Cycom 977-2A carbon/epoxy composites for quickstep processing, Laraib A. Khan, Ayesha Kausar, Syed Tajjamal Hussain, Zafar Iqbal, Richard J. Day, Ahmed Shuja Syed and **Zaffar M. Khan**, *Polymer Engineering Science* doi: 10.1002/pen.23629.
<http://onlinelibrary.wiley.com/doi/10.1002/pen.23629/epdf> (IF 1.5)
19. Effect of Hygrothermal Conditioning on the fracture toughness of carbon/ epoxy composites cured in autoclave/ quickstep., Ali Hassan Mahmood, Laraib Alam Khan, Ahmed Shuja Syed, **Zaffar M. Khan**, Richard J. Day, *Journal of Reinforced Plastics and Composites*, Manuscript ID: JRP-13-0057.R2, 2013.
<http://jrp.sagepub.com/content/32/16/1165.abstract> (IF 1.5)
20. Aluminum Silicate Fibers Impregnated Acrylonitrile Butadiene Rubber Composites: Ablation, Thermal Transport/ Stability and Mechanical Inspection, Nadeem Iqbal, Saadia Sagar, M. Bilal Khan. M. Ismael Bossouni and Zaffar M. Khan, *Journal of Applied Polymer Science*, DOI:10.1002/APP.39717. Vol 130, Issue 06, 2013, pp 4392-4400.
<http://onlinelibrary.wiley.com/doi/10.1002/app.39717/epdf> (IF 1.4)
21. Spectra Fibers Impregnated Acrylonitrile Butadiene Rubber Composites: Ablation, Thermal Transport/ Stability and Mechanical Investigation, Nadeem Iqbal, Saadia Sagar, M. Bilal Khan

- and **Zaffar M. Khan**, Journal of Composites Science and Technology, CSTE-D-13-00071. <http://www.sciencedirect.com/science/journal/02663538/72/6> (IF 3.5)
22. Post curing effect of polyepoxy on visco-elastic and mechanical properties of different sandwich structures, Ali Hassan Mahmood, Laraib Alam Khan and **Zaffar Khan**, Polymer Composites, DOI: 10.1002/pc.22436, 6 March 2013. <http://onlinelibrary.wiley.com/doi/10.1002/pc.v34.4/issuetoc> (IF 1.632)
 23. Hydrogen Silsesquioxane Resist Stamp for Replication of Nanophotonic Component in Polymer, J. micro/ lithography, MEMS and MOEMS, M R Saleem, P A Stenberg, M B Khan, **Z M Khan**, S Honkanen, J. Turonen, 11 (1)013007 (Jan-Mar 2012). <https://spie.org/Publications/Journal/10.1117/1.JMM.11.1.013007> (IF: 1.428)
 24. Synthesis and Characterization of Carbon Particles Reinforced Epoxy Nanocomposites in Ku-band, Rahim Jan, M. Bilal Khan, **Zaffar M. Khan**, Materials Letters 70 (2012) 155-159. <http://www.sciencedirect.com/science/journal/0167577X/70> (IF 2.4)
 25. Development of Resin Infusion Process for Ultralight Large Composite Structures, **Zaffar M Khan**, Ghulam Yahya, M. Umer, Bilal Khan, Faraz Tahir, Journal of Advanced Materials Research Vol 326 (2011), pp 53-66. ISBN: 978-3-03785-227-9. <http://www.ttp.net/1022-6680.html>
 26. Horizontal Patterns of Single Wall Carbon Nanotubes by Simple Filtration Process Method, Munir Mohammad, M Bilal Khan, **Zaffar M Khan**, Gabriel Cavilli, Damitha Adhikari, Ravi Silva, Journal of Advanced Materials Research Vol: 326, (2011), pp 121-126. ISBN: 978-3-03785-227-9. <http://www.ttp.net/1022-6680.html>
 27. Enhancement of Mechanical Properties of Kevlar-Epoxy Composite by Improving the Interface Coupling, M. B. Khan, S. Hussein, R. Hussein and **Z. M. Khan**, SAMPE Journal of Advanced Materials, Vol. 42, n: 3, pp. 74-87, Jul 2010.
 28. Complex Optical Filter Prepared by Sputtering Deposition, M. H. Asghar, M. Shoaib, **Z. M. Khan**, F. Placido, S. Naseem and M. Mohammad, European Journal of Applied Phys. 49, 20501 (2010) 20501, p1-6. <http://epjap.epj.org/> (IF: 0.789)
 29. Polymer Nanocomposites: Prospects, Potentials and Applications in Next Generation Aerospace Structures, **Dr Zaffar Khan** and Dr Bilal Khan, NUST Journal of Engineering Sciences , ISSN: 2070-9900, Vol. 2, No. 1, 2009, p91-99. <http://journals.nust.edu.pk/index.php/njes>.
 30. On-line Condition Monitoring System of Composite Structures using Fiber Optic Sensors, **Zaffar M. Khan**, NUST Journal of Engineering Sciences , ISSN: 2070-9900, Vol. 2, No. 1, 2009, p122-128. <http://journals.nust.edu.pk/index.php/njes>
 31. A Review of Heat Exchanger Tube Bundle Vibrations in Two-Phase Cross-Flow, Shahab Khushnood, **Zaffar M. Khan**, M. Afzal Malik, Zaffar Ullah Koreshi & Mahmood A. Khan, Journal of Nuclear Engineering and Design, Ref. NED-3985, Elsevier, Vol. 230, Issues 1-3, May 2004. <http://www.sciencedirect.com/science/article/pii/S0029549303003960> (IF 1.4)
 32. Impact of Composite Materials on Engineering Industry, **Zaffar M. Khan**, Journal of Science Technology and Development' ISSN: 0254-6418, Jan-Mar 1994, Vol 13, No: 1, pp16-22. <http://www.std.com.pk/>
 33. Modeling and Analysis of Thermal Damping in Heat Exchanger Tube Bundles, Shahab Khushnood, **Zaffar M. Khan**, M. Afzal Malik, Zaffar Ullah Koreshi & Mahmood Anwar Khan, J. of Nuclear Engineering and Design, Vol 240 (7), Jul 2010, 1906-1918, <http://www.sciencedirect.com/science/article/pii/S0029549310002165> (IF 1.4)
 34. Composite Armor, **Zaffar M. Khan** Defence Journal, ISSN 0257-2141, Vol. XIX, No 11-12, 1993, pp. 15-16.
 35. Design & Development of Advanced Carbon Fiber Composites, **Zaffar M. Khan**, Engineering Horizons, ISSN 1017-8260, Vol. IV, No. 5, May 1993, pp 5-11. <http://engghorizons.com/>

Conference Proceedings:

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 22. Design and Analysis of Composite Structures, **Zaffar M. Khan** Conference Proceedings, International Bhurban Conference on Applied Sciences and Technology, Hotel Pearl Continental, Bhurban, Murree, Jun 2003.
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 28. Design and Development of Advanced Carbon Fiber Composites, **Zaffar M. Khan** Presented at GIK Institute of Sciences and Technology on 06 Oct, 1992, published in Engineering Horizon, ISSN 1017-8260, Vol. 4, No. 5, May 1993, pp. 5-11
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 34. Modeling and Analysis of cross-flow induced vibrations in a heat exchanger tube bundle Proceedings of 4th International Conference on Mechanics and Materials in Design, **Zaffar M. Khan** et al, Nagoya, Japan, June 5-8, 2002

35. On the Effect of Void Fraction in Two-phase cross-flow induced tube bundles vibration, **Zaffar M. Khan** A review, Proceedings of 3Prd International Symposium on Mechanical Vibrations, Islamabad, Sept. 23-27, 2002.
36. Cross-Flow Induced Vibrations in Tube Bundles A Review, Shahab Khushnood, **Zaffar M. Khan**, M. Afzal Malik, Zaffar Ullah Koreshi & Mahmood Anwar Khan Proceedings of 11th International Conference on Nuclear Engineering, Tokyo, ASME/ JSME, April 20-23, 2003.
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38. Modeling Fluid Forces And Response of a Tube Bundle In Cross-Flow Induced Vibrations, Shahab Khushnood, **Zaffar M. Khan**, M. Afzal Malik, Zaffar Ullah Koreshi & Mahmood Anwar Khan 11Pth International Conference on Nuclear Engineering, Tokyo, Japan, Under ASME/JSME Applied Polymer Composites, Smithers Rapra, Vol. 2, No. 1, (2014), pp., April 20-23, 2003).
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42. Microbend Fiber Optic Sensor for Assessing Layer Waviness in Carbon Epoxy Laminate, **Zaffar M. Khan**, 6th International Symposium on Advanced Materials , 1999
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44. Advanced Composite Materials, **Zaffar M. Khan**, The News of the Pakistan Nuclear Society, Vol. 4, PP 1-4, 1995
45. Composite Armor in Military Defense, **Zaffar M. Khan**, 1st International Symposium on Tank Technology, Vol. 13, pp 6-22, 1994.
46. The Influence of Microstructure and Physical Properties on Wear Mechanism on Cemented Carbides, **Zaffar M. Khan**, Proc. 3rd International Symposium on Advanced Materials, pp 178-188, 1993
47. Fabrication and Thermal Investigation of Ablative Nanocomposites, Nadeem Iqbal, Mohammad Bilal Khan, Zaffer M Khan, IBCAST, Islamabad 2012 (Oral Presentation).
48. Fabrication and Thermal Investigation of Ablative Nanocomposites, Nadeem Iqbal, Mohammad Bilal Khan, Zaffer M Khan, IBCAST, Islamabad 2012 (Oral Presentation).

- **Selected Keynote/ Invited Presentations:**

1. On-line Structural Health Monitoring under Static and Dynamic Loading using Piezoelectric Nanosensors, Materials Plus 2018, International Forum on Materials for Harsh Environments, Nanjing University of Aeronautics and Astronautics, China, Oct 28, 2018
2. Smart Composites, Department of Materials Engineering, Nanjing Institute of Aeronautics and Astronautics, Nanjing, China, Jul 7, 2017
3. Structural Health Monitoring using Nanosensors, Pakistan Institute of Applied Sciences and Engineering, Nellore, Pakistan, Oct 23, 2017

4. Effect of void content on the mechanical properties of unidirectional carbon fiber reinforced epoxy composites. 11 International Conference on Composite Science and Technology, American University of Sharjah, April 3-5, 2017
5. Composites Design and Analysis. International Workshop on Composites Design, Analysis and Optimization, Institute of Space Technology, Islamabad, Pakistan, May 27, 2014.
6. Vacuum Assisted Composites Manufacturing, International Workshop on Cost effective Composites Manufacturing, Institute of Space Technology, Islamabad, Pakistan, Institute of Space Technology, Islamabad, 24 Feb – 8 Mar, 2014.
7. Commercialization of Composite Materials in Engineering Industries, Composite Show and Policy Dialogue, sponsored by British Council DelPhi Program, Islamabad Hotel, Pakistan, Dec 5th 2012.
8. Aerospace Composites: Manufacturing and Certification Issues, International Conference on Aeronautical Science & Engineering, Institute of Space Technologies, Pakistan, Dec 28, 2011.
9. Advanced Composites Manufacturing and Certification Issues, International Symposium on Advanced Materials, National Center of Physics, Quaid-i-Azam University, Islamabad, Pakistan, Sep 28, 2011.
10. Multifunctional Polymer Nanocomposite Materials for Next Generation Aerospace Vehicles, Digital International Conference and Exhibition, Institute of Space Technology, Islamabad, Dec 20, 2010.
11. Impact of Composite Materials on Engineering Industries – Global and Local Perspective in Workshop titled The Future of High Tech Industry in Pakistan, Serena Hotel, Islamabad, Dec 8, 2010.
12. Energy Efficient Composite Materials for Development of Ultralight Car Body, International Conference on Power Generation Systems and Renewable Energy Technologies, International Islamic University, Islamabad, Nov 29, 2010.
13. Composite Materials: Challenges and Opportunities, Workshop on Development Partnership in Higher Education sponsored by British Council in collaboration with NCCEF, Manchester, UK, Sep 28, 2010.
14. Failure Modes, Pattern and Sequence in Composite Materials, Conference on Failure of Engineering Materials and Structures, University of Engineering and Technology, Taxila, Pakistan, 22 Oct, 2007.
15. Development of Metal Matrix Composites and Polymers for High Temperature Applications, Pakistan Materials Science Society, Islamabad, Pakistan, 19-20 Dec, 2005.
16. Advanced Materials and Composites, International Conference on Applied Science and Technology, National Center for Physics, Quaid-i-Azam University, Islamabad, Pakistan, Jun 10-12, 2002
17. Fiber Optic Sensor for Assessing Layer Waviness Defect in Smart Structures, Department of Industrial and Mechanical Engineering, Concordia University, Canada, Aug 22, 2001.
18. Prospects, Potentials and Applications of Advanced Carbon Fiber Composites in Next Generation Aerospace Vehicles, Center of Excellence, National Engineering and Scientific Commission, Islamabad, Pakistan, May 22, 1997.
19. Design and Development of Advanced Composite Materials in Civil and Military Aircrafts, 1st International Aeronautical Conference organized by the Royal Aeronautical Society at PAF Academy, Risalpur, Mar 27, 1995.
20. Status of Advanced Composites Industry in Pakistan, International Center for Science and High Technology, ICTP, Trieste, Italy, Nov 2nd, 1994.
21. Fiber Optic Smart Structures and Intelligent Materials, 7th International Symposium on Advanced Materials, Islamabad, Pakistan, 19 Sep, 2001.
22. Drilling Induced Failure Modes, Pattern and Sequence in Carbon-Epoxy Composite Materials, Department of Materials Science and Mechanics, College of Engineering, Michigan State University, East Lansing, May 2nd, 1996.
23. Prospects, Potentials and Applications of Advanced Composite Materials in Aircraft Structures, The Royal Aeronautical Society, Pakistan International Airlines Training School, Karachi, March 24, 1994.
24. Prospects, Trends and Potentials of Composite Materials, S-Block, Ministry of Science and Technology, Pakistan Secretariat, Islamabad, 1992.
25. Design and Development of Fiber Optic Smart Structures in Aerospace Vehicles, Khan Z. M. 23rd Congress of International Council of the Aeronautical Sciences, 8-13 September, 2002, Toronto,

Canada, Paper ICAS 2002-4.9.3.

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