

Curriculum Vitae

ZHONG, Wei Hong (Katie), Ph.D.

Westinghouse Distinguished Professor

**School of Mechanical and Materials Engineering
Washington State University, Pullman, WA 99164, USA
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Dr. Zhong received a Ph.D. degree in 1994 in the Composites and Manufacturing Program of the Department of Materials Science and Engineering at Beijing University of Aeronautics and Astronautics (BUAA) in Beijing, China. From 1995 to 2001, Dr. Zhong was Associate Director of the Composite Materials and Technology Program in BUAA. In 1999 Dr. Zhong was promoted to full professor, becoming the youngest full professor at BUAA, and one of the youngest full professors in China. From June 2001 to April 2002, as a visiting scholar Dr. Zhong conducted research on composite repair technology at Tuskegee University. From May 2002 to August 2003, she worked as a research associate at Vanderbilt University doing research on nanocomposite materials. Dr. Zhong began associate professorship in the Mechanical Engineering Department at North Dakota State University (NDSU) in August 2003. In August 2007, Dr. Zhong joined Washington State University (WSU), in which currently she is an endowed chair professor. Dr. Zhong is a reviewer/panelist for NSF, DoE and DoD grant proposals and a consultant for The Boeing Company in the area of nanotechnology since 2006. She has been an instructor for the Boeing Nanotechnology Curriculum for the Engineering and Scientific staff. Dr. Zhong received numerous awards/honors including the Dow Chemical Composites Educator of the Year 2011 by SPE, selected one of the 15 World's Best Scholars to University British Columbia (UBC), Vancouver, BC, Canada, in 2012, In addition, she was awarded the Excellent Academic Advisor at WSU in 2013, because she has graduated several outstanding PhD students who received quite a few international rewards/global honors, such as Boeing Flightglobal Awards/Boeing Engineering Student of the Year 2010 (2nd place) and 2012 (1st place), and Worldwide Top 50 PhD/post-docs by MRS (2 PhD students selected) in 2011. Dr. Zhong has had over 260 publications, including 167 peer-reviewed papers, 5 book and book chapters, 90 conference papers, and a number of patents.

EDUCATION

- Ph.D., 1994 Composite Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China

Dissertation: *Studies on Residual Stress of ARALL, and the Effects on Properties of the Laminates by Residual Stresses and Adhesive*

Advisor: C.Q. Chen, Distinguished Professor, Department of Materials Science and Engineering, Beijing University of Aeronautics and Astronautics
- M.S., 1991 Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China

Thesis: *A Study on the Thermal Expansion Coefficient and the Design for Zero-Expansion of Single and Hybrid Multi-Directional Composites*

Advisor: Prof. H.C. Song, Director of Composite Materials Division, Department of Materials Science and Engineering, Beijing University of Aeronautics and Astronautics
- B.S., 1988 Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China

PROFESSIONAL EXPERIENCES AND APPOINTMENT

Academic

- 08/12--present: Westinghouse Distinguished Professor, Materials Science and Engineering, Washington State University, Pullman, WA 99164
- 09/12—05/13: Sabbatical leave, Honored International Scholars, University of British Columbia, Vancouver, BC, Canada, V6T 1Z4
- 08/10-present: Professor, Department of Mechanical and Materials Engineering, Washington State University, Pullman, WA 99164.
- 08/07—08/10: Associate Professor, Department of Mechanical and Materials Engineering, Washington State University, Pullman, WA 99164.
- 08/07--present: Affiliated faculty, Doctoral Program in Materials Science and Engineering, Washington State University.
- 08/08-present: Affiliated faculty, Composites Science and Engineering Center, Washington State University.
- 08/03—08/07: Associate Professor, Department of Mechanical Engineering and Applied Mechanics, North Dakota State University, Fargo, ND 58105
- 05/02—08/03: Research Associate, Vanderbilt Institute for Nano-scale Science and Engineering, Vanderbilt University, Nashville, TN 37235
- 06/01—04/02: Visiting Scholar, Department of Mechanical Engineering, Tuskegee University, Tuskegee, AL 36088
- 08/99—08/03: Professor, Department of Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China
- 09/95—01/01: Associate Director of Composite Materials and Technology Program, Beijing University of Aeronautics and Astronautics, Beijing, China
- 08/95—08/99: Associate Professor, Department of Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China
- 04/96—05/97: Visiting Scholar, Materials Engineering Program, Department of Mechanical Engineering, Auburn University, Auburn, AL 36849
- 03/94—08/95: Assistant Professor, Department of Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China.

HONORS, AWARDS AND APPOINTMENTS

- Excellence as an Academic Advisor, WSU, 2013
- Outstanding Researcher Award, School of Mechanical and Materials Engineering, WSU, 2011 & 2013
- Westinghouse Distinguished Professor, 2012, WSU
- Selected one of the 15 World's Best Scholars to University British Columbia (UBC), Vancouver, BC, Canada, 2012;
- The Dow Chemical Composites Educator of the Year 2011 by SPE;
- Best Paper Award from 2011 Society of Plastics Engineering (SPE) Automotive Composites Conference & Exhibition (ACCE), September 2011;

- 2 NASA Technology Awards, March 2011:
Innovation “Fiber-Reinforced Reactive Nano-Epoxy Composites” NASA MFS-32666-1
Innovation “Modifying Matrix Material to Increase Wetting and Adhesion” NASA MFS-32665-1
- Researcher of the Year Award, NDSU College of Engineering and Architecture, 2004-2005
- NSF Summer Institute on Nano and Biotechnology Fellowship, 2005
- Panelist of NSF Graduate Research Fellowship Program (GRFP), 2008
- Panelist of NSF DMI (Nanomanufacturing and Innovation of Nanocomposites), 2006
- Co-chair of the *Airplane Composites* session for SAMPE’06, Dallas, TX, 2006
- Chair of *Nanocomposites and Processing Technology* session of 16th International Conference on Composite Materials (ICCM-16), Kyoto, Japan, July 2007
- Judge Chair, Engineering and Corrosion session, 56th North Dakota Science and Engineering Fair, April 7, 2006.
- Influential Faculty Member, listed by a graduate alumni Kimberly Gedde (2004), indicating her work as an instructor truly impacted life of her students stated by NDSU Alumni Association
- Organization committee, International Carbon Conference, Beijing, China, 2000.
- Research Award, Ministry of Education, China, 1995, 2000
- Research Award, Ministry of Aviation Industry, China, 1997, 1999
- Outstanding Professor Award, Beijing Municipal Education Bureau, China, 1998
- Teacher of the Year, Beijing University of Aeronautics and Astronautics, Beijing, China, 1999
- Teaching Award, Beijing University of Aeronautics and Astronautics, Beijing, China, 2000
- Best Teaching Award, Xi-An Airplane Co., Beijing, China, 2000
- Outstanding Young Professor Award, Ministry of Education, China, 2001
- Advisory Board Member, Ministry of Science and Technology, China, 1999-
- Advisory Board Member, National Science Foundation of China, 2001-
- Journal Editorial committee member, *New Carbon Materials*, 2001-
- Associate Director of Composite Materials and Technology Program, Department of Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China, 1997-2001
- Deputy-director of Young Materials Scientist Division, Materials Society of China, 2000
- Elected Committee Member, Composite Materials Division, Aviation Society of China, 2000
- Deputy-director of Beijing Composite Materials, Mechanics and Processing Technology Laboratory, Beijing University of Aeronautics and Astronautics, Beijing, China, 1997-2001
- Organizational committee of Beijing Women Professor Association, China, 1997-2001
- Reviewer of Books, Grant Proposals and Journal Papers:

Books:

“The New UHMMPE Handbook” (2nd Ed), Edited by S.M. Kurtz,
Elsevier, Linacre House, Jordan Hill, Oxford OX2 8DP, UK

“Fundamental Principles of Polymeric Materials”, by S. L. Rosen,
A Wiley-Interscience Publication, John Wiley & Sons, Inc., New York

“Organic/Inorganic Nanoparticles for Advanced Composite Materials”
DEStech Publications, Inc. Lancaster, PA USA

“Electromagnetic Composite Materials: Applications, Analysis and Design”,

DEStech Publications, Inc. Lancaster, PA USA

“Graphene and Its Applications to Composites and Advanced Materials”, DEStech Publications, Inc. Lancaster, PA USA

“New Frontiers in Ferroelectric Polymers”, DEStech Publications, Inc. Lancaster, PA USA

Grant Proposals:

In areas of Lithium Battery Materials, submitted to DoE;

In the areas of Nanomanufacturing and Innovation of Nanomaterials, submitted to NSF (National Science Foundation);

-NSF Engineering Research Center Proposal;

-Panelist of NSF (Nanomanufacture and Innovation of Nanocomposites);

In the areas Nanocomposites and Polymers, submitted to AFOSR (Air force of Scientific Research);

In the areas of Nanomaterials and Nanocomposites submitted to American Chemical Engineering PRF;

In the areas of Energy Storage Materials, submitted to Global Climate and Energy Project (GCEP) at Stanford University

Journals: Include:

Advanced Materials

Advanced Energy Materials

Polymers

Macromolecular Materials and Engineering

Mechanics of Advanced Materials and Structures

Journal of Materials Science and Technology

Composite Materials

Journal of Biomedical Materials Research, Part A

New Carbon Materials

Journal of Composite Materials

Langmuir

Materials Science and Engineering A

Journal of Materials Science

Small

Carbon

Composites, Part A

European Polymer Journal

Journal of Materials Chemistry

Journal of Nanomaterials

Journal of Physical Chemistry

Nanotechnology

Smart Materials Structures

Macromolecular Materials and Engineering

ASME Journal of Engineering Materials and Technology

Materials Physics and Chemistry

RESEARCH INTERESTS

- Advanced Lithium Battery Materials: bio-solid electrolytes, gum-like electrolytes with safety design for high performance lithium batteries, foldable/bendable electrolytes, interface of electrodes/electrolytes;
- Bio Air Filtering Materials: processing technologies, functionalities including filtering effects, and thermal conductivities; application issues;
- Nanotechnology and Multifunctional Nanocomposites: processing, structural design, mechanical properties, and functionalities including electrical, damping and thermal properties;
- Quantitative Quality Evaluation for Nanocomposites: quantitative evaluation technique, non-destructive evaluation technology for industry nanocomposite products;
- Polymer and Composite Materials: manufacturing technologies; interface issues; mechanical properties; repairing;

RESEARCH EXPERIENCES

08/03-present:

- Solid Polymer Electrolytes for Safe Li-ion Battery Technology; Bio-based electrolytes, ultra flexible electrolytes for next generation lithium battery applications;
- Acoustic Damping Properties of Polymer Nanocomposites for Aero-structure Interior Materials;
- Capacitor Materials and Dielectric Performance of Nanocomposites;
- Tribological Performance of Nanocomposites: wear resistance, friction, etc.;
- Total Joint Replacement Materials: UHMWPE nanocomposites;
- Electrically and Thermally Conductive Polymer Nanocomposite Materials:
Investigate the electrical and thermal conductivities and dielectric properties of nanocomposite materials; develop conductive nanocomposites used for airplane structures and fuel cell applications.
- Hybrid Composites with Reactive Nano-Matrix for Cosmic Radiation Shielding:
Investigate more reliable multifunctional high performance shielding materials, i.e., ultrahigh molecular weight polyethylene (UHMWPE) fiber/graphite fiber hybrid composites with reactive nano-matrix.
- Reactive Graphitic Carbon Nanofiber-Reinforced Polymers as Advanced Composite Matrices or Structural Adhesives:
Investigate unified super molecular structure, nanofiber-polymer that can be used advanced composite matrix or structural adhesive materials with extremely high mechanical properties.
- Improvement of Fiber/Matrix Interface of Composites Using Reactive Nano-matrix:
Investigated the improvement of interfacial adhesion in continuous fiber/polymer composites using reactive nano-matrix.

05/02-08/03:

- Graphitic Carbon Nanofiber/Polymer Composites with Superior Mechanical Properties:

Investigated processing of the graphitic carbon nanofiber/polymer composite materials, mechanical properties measurements and characterization of nano-structure and failure mechanism

06/01-04/02:

- Durability Assessment of Composite Repairs Bonded to Aircraft Structures:

Investigated the interface between composite patch and aluminum substrate, effects of parameters on fatigue crack growth rates, fatigue lifetime testing and prediction, and fatigue design guidelines to the repaired structures

- Field Testing Flood-Damage-Resistive Residential Envelope Systems:

Evaluated the performance of residential envelope systems subjected to static flooding. Developed a systematic approach to testing the systems; determined the extent of the system's flood damage resistance

07/97-05/01:

- Resin Matrix Systems and the Composites Cured by Electron Beam Technology:

Examined electron beam curing method as a potentially cost-effective for manufacturing composite structures; developed epoxy and bismaleimide resin systems for Electron Beam curing

- Resin Matrix and the Composites for Infrastructures Application:

Investigated glass fiber and carbon fiber composite materials application for reinforcing concrete constructions such as buildings and bridges

- Cost-effective Manufacturing Technology of Advanced Polymer Composites:

Investigated resin Transfer Molding (RTM) as an outstanding cost-effective technology of curing advanced polymer composites

- Fiber Reinforced Composites by Rapid Prototyping Manufacturing (RP&M) Technology:

Investigated short fiber and continuous fiber reinforced composite materials by Rapid Prototyping Technology

04/96-05/97:

- Quasi-Carbon Fibers and Composite Materials:

Examined conductive properties and pyrolysis processing method of PAN quasi-carbon fiber and the resulted composite materials

04/94-03/96:

- Smart Composite Materials and Systems:

Investigated processing and properties of smart composite materials and systems with optical fibers

- A New Hybrid Composite Reinforced with Different Diameter Fibers:

Investigated a new hybrid composite reinforced with different diameter fibers with superior comprehensive mechanical properties

- Comprehensive Evaluation of Advanced Polymeric Composites:

Developed fuzzy theory to evaluate advanced polymeric composite materials with comprehensive properties

- High-Speed Impact Property of Polymer Composite Materials:

Developed composite structure with excellent high-speed impact properties

- Hybrid Composites of Aramid-Aluminum Laminates (ARALL) Processing and Properties:

Examined the mechanical properties and processing feasibility of super-hybrid composites (ARALL)

- Ultra-High Molecular Weight Polyethylene (UHMWPE) Fiber and Composite Materials: Determined the structure and properties of the UHMWPE fiber and resulted composite materials

TEACHING EXPERIENCE

Courses responsible for:

WSU:

1. Polymeric Materials (for undergraduate students)
2. Materials Science (for undergraduate students)
3. Engineering Composites (for undergraduate students)
4. Nanocomposites and Functionalities (for graduate students and The Boeing Co.)

NDSU:

1. Engineering Mechanics I: Statics (for undergraduate students)
2. Polymer Materials and Processing (for Senior undergraduates students and graduate students)
3. Composite Materials and Manufacturing Technologies (for Senior undergraduates students and graduate students)
4. Nanocomposites and Functionalities (for graduate students)

BUAA:

1. Polymer Matrix Composites and Processing Technologies (for Undergraduates)
2. Mechanical Properties of Engineering Materials (for undergraduates)
3. Introduction to Engineering Materials (for Undergraduates)
4. Novel Polymer Materials (for graduates)
5. Functional Composite Materials (for graduates)
6. Advanced Polymers Science and Engineering (for graduates, in English)
7. Advanced Composites Science and Engineering (for graduates, in English)
8. Advanced Composites Manufacturing (for graduates, in English)

Graduate Students Advisor:

WSU:

Yu Wang, PhD student, 08/2012-07/2015
 Bin Li, PhD, graduated, 08/2008 – 05/2012
 Weston Wood, PhD, graduated, 08/2008 – 08/2012
 Jianying (Tracy) Ji, PhD, graduated, 08/2009 – 05/2013
 Brooks Lively, PhD, graduated, 08/2009 – 12/2013
 Tian Li, PhD graduated, 08/2011-05/2014
 Allen Eyler, PhD student, 08/2012-08/2016 (expected)
 Xuefei, Fu, PhD student, 08/2015-07/2019 (expected)
 Hamid Souzandeh, PhD student, 09/2013-08/2017 (expected)
 Xiaolin Wang, PhD student, 08/2014-08/2018(expected)
 Tian Liu, MS, graduated, 08/2009 – 05/2011,
 Michael Pierce, MS, graduated, 08/2011-05/2013
 Lanee Snow, PhD student (part time), 08/2008 – 01/2011

Zack Tang, MS, graduated, 08/2010 – 12/2011
Lili Sun, visiting PhD student, graduated, (dissertation advising), 09/2008 – 10/2010
Brady Deacon, MS, graduated, 01/2011-05/2012
Yu Fu, MS, graduated, 08/2008 – 07/2010
Soumen Jana, PhD student, 08/2007 – 08/2008
Lu Chen, MS student, 08/2014-08/2016 (expected)

Supervisor of post-Doctors/visiting professors at WSU:

Dr. Tian Liu (post-doc, 05/2013-present)
Dr. Yu Wang (post-doc, 08/2015-present)
Dr. Bing Geng (visiting professor, 09/2013-08/2014)
Dr. Bin Li, (post-doc, 08/2012-08/2013)
Dr. Jianying (Tracy) Ji, 05/2013-07/2013
Dr. Yunhua Yu (visiting professor, 01/2011-01/2012)
Dr. Yugang Duan (visiting professor, 01/2010-01/2011)
Dr. Sandeep Kumar (post-doc, 02/2009-08/2010)
Dr. Gang Sui (post-doc, 09/2007-10/2007 and visiting professor 04/2008-08/2008)

MAIN RESEARCH FUNDINGS

WSU, 08/2007-present:

1. PI, NSF, A Gum-like Multifunctional Composite for High-performance Electrolyte: Processing, Structures and Performances, \$350,000, 08/15/2015-08/15/2018.
2. PI, USDA: Applying Abundant Plants to Develop Battery Materials and Benefits to the Agricultural Economy, \$494,805, Co-PIs: L. Scudiero, H.W. Lei, T. Harsh, 01/01/2015-12/31/2017.
3. PI, NSF: A Gum-like Multifunctional Composite for High-performance Electrolyte: Processing, Structures and Performances, \$350,000, 08/15/2015-08/15/2018.
4. PI, WA-JCATI: Joint Center for Aerospace Technology and Innovation of WA, “Bio-based Solid Polymeric Electrolytes for a Safer Higher Performance Lithium Ion Battery”, 02/01/2013- 06/30/2013, \$71,479.
5. PI, WSU Research Advancement Challenge Grant, Advanced Lithium-ion Batteries Incorporating Bio-and Nano-materials and the Effects on the Agricultural Economy, Co-PIs: M. G. Norton, L. Scudiero, T.L. Marsh, and H.W. Lei, 10/01/2012-09/30/2013, \$100,000
6. PI, Boeing & SABIC-IP: “Multi-functional Polymeric Materials (MPM) for Reduced Weight of Airplane Interior Materials, Improved Fuel Efficiency and Decreased Fabrication Costs: Materials, Modeling and Processing”, 03/01/2011-02/28/15, (in collaboration with KAUST), \$841,045.
7. PI, NSF: “Interfacial Wetting and Adhesion Enhancement in Advanced Organic-Fiber/ Polymer Matrix Composites through “Nano-nectar” with Reactive Nanofibers”, 09/16/2010-09/15/2013, \$302,303.
8. PI at WSU: NSF Collaborative: “Tribologically Durable UHMWPE Nanocomposites or Total Joint Replacements:Nano-mechanics & Bio-tribological Modeling”, 07/2009-07/2012, (in collaboration with North Dakota State Univ: A. Tangpong (PI), and I. Akhatov (Co-PI), total: \$370,000), Zhong/WSU: \$162,350,.
9. PI, Boeing Co., “Multifunctional Nanofoamed Thermoplastic Nanocomposites for Reduced Profusion of Airplane Interior Materials and Improved Fuel Efficiency”, 05/2008-12/2009, Boeing/UW/WSU collaboration, \$150,806, Zhong: \$88,709.

10. PI at WSU: NSF GOALI, “Fabrication of Multifunctional Nanofoams from Polymer Nanocomposites”, 09/16/2007-09/15/2010, \$300,000, (in collaboration with Univ. of Wash and Boeing Co.), Zhong’s part: \$120,000.
11. Co-PI, NSF NIRT, “Total Chemical Synthesis, Property and Modeling Studies of Nanoparticle/Polymer Hybrid Materials”, 08/01/2005 -- 07/30/2009, \$1,199,479, (in collaboration with North Dakota State Univ of W.F. Sun (PI), Univ. of Central Florida of J. Brennan (co-PI) and Q. Huo (co-PI)), Zhong’s part: \$290K.

NDSU, 08/2003 – 07/2007:

12. PI, NASA: “Hybrid Composites with Reactive Nano-fibers for Cosmic Radiation Shielding”, 07/01/2004 -- 06/30/2007, \$393,343.
13. Co-PI, NSF NIRT: “Total Chemical Synthesis, Property and Modeling Studies of Nanoparticle/Polymer Hybrid Materials”, 08/01/2005 -- 07/30/2009, \$1,199,479 (PI: W.F. Sun, other Co-PIs: J. Brennan and Q. Huo)
14. PI, NSF: “Acquisition of a Twin Screw Extruder for Polymer/Bio Nanocomposites”, 08/01/2004 -- 07/31/2006, \$103,308 (Co-PIs: K. Katti, D. Katti) (Original PI was Dr. J. Wong and then was Dr. B.Z. Jang; I was the PI from 08/2005 -- 07/2006).
15. PI, The Spirit Aerosystems Co: “Mechanical Property Enhancement to CFRP Composites Using Reactive Nano-Matrix for Application to Next-Gen Commercial Aircraft Primary Structure”, 11/01/2006- 04/30/2007,\$55,000.
16. PI, ND EPSCoR: “Acquisition of a Dielectric Spectrometer for Polymer Nanocomposites”, 02/01/2006 -- 04/15/2006, \$49,800.
17. PI, DOE EPSCoR: “Ultra-lightweight Polymer Composites for Wind Energy System-Turbine Bladed Structures”, 05/15/2007-12/31/2008, \$49,770.
18. Co-PI, NSF GOALI: “Fabrication of Multifunctional Nanofoams from Polymer Nanocomposites”, 09/16/2007-09/15/2010, \$300,000. (Collaboration with Univ. of Washington and Boeing Co.), Zhong’s part: \$120,000.
19. Co-PI, USDA: “Acquisition of Dynamic Mechanical Analyzer to Upgrade Research Infrastructure”, Cooperative State Research, Education, and Extension Service (CSREES)/United Department of Agriculture (USDA) – National Research Initiative (NRI) Competitive Grants Program (PI: Dr. C.A. Ulven, Co-PIs: D. P. Wiesenborn and W.H. Zhong), 10/01/2007-09/30/2008, \$32,650.
20. PI, NDSU Research Foundation: “Reactive Graphitic Carbon Nanofiber-Reinforced Polymers as Advanced Composite Matrices or Structural Adhesives”, 02/01/2004 -- 01/31/2005, \$ 10,000.
21. PI, NASA EPSCoR: “Improvement of Fiber/Matrix Interface Using Reactive Nano-matrix for Cosmic Radiation Shielding Composites”, 01/15/2004 -- 07/15/2004, \$18,100.

BUAA, 04/1994 – 06/2003:

As PI:

- Fundamental Study of Rapid Prototyping Manufacturing (RP&M) Methods for Fiber Composite Materials, supported by NSF of China, 1999-2001
- Composite Materials for Using in Strengthening and Rehabilitation of Infrastructures, supported by Ministry of Education, China, 1999-2001
- Characterization and Optimization of Several Types of Advanced Carbon Fibers Reinforced Composites, supported by National Composite Laboratory, China, 1999-2001
- Fibers and the Composite Materials with Controlled Conductivity, supported by National Composite Laboratory, China, 1997-2000

- Electron Beam (EB) Curing as a Cost-effective Manufacturing Method for Composite Structures, supported by NSF of China, 1999-2002
- A New Hybrid Composite Materials Reinforced with Different Diameter Fibers, supported by Aviation Foundation, 1995-1998

As Co-PI:

- Polymer Composite Laminates with High Speed Impact Performance, supported by National Composite Laboratory, China, 1996-2000
- Polymer Matrix and Composites Cured with Radiation of Electron Beam, supported Aviation Foundation of China, 1997-1999
- Mechanical Properties and Failure Analysis for Smart Composite Structure Imbedded with Optical Fiber, supported by Beijing Polymer Matrix Composite Materials Laboratory, 1997-1999
- Conductive Fibers and Composite Materials, supported by NSF of China, 1995-1997
- Structural Composite Materials with Low Coefficient of Thermal Expansion, Aviation Foundation of China, 1994-1996
- Bio- elastomeric ionic conductive materials

PATENTS ACHIEVED/FILED

- **US Patent** PCT/US2014012727, WO2014/149181 A1 (International Patent Publication): Y. Wang, W. H. Zhong*, and B. Li, “Gum-like Electrolytes with Thermal-protection Capability”, WSU, Sept 2014.
- **US Patent** US 8,722,254 B2: W.H. Zhong*, J. Y. Ji and B. Li, “Flexible Solid-State Conductors Including Polymer Mixed with Protein”, WSU, Feb 2014;
- **US Patent** 8,048,940 B2: C.M. Lukehart, W.H. Zhong, J. Li, and E.D. Mowles, “Reactive Graphitic Carbon Nanofiber Reinforced Epoxy Composites Showing Enhanced Flexural Strength”, 2011.
- **US Patent** 6,401,002: J. Jang, W. C. Huang, W.H. Zhong, “Layer Manufacturing Apparatus and Process”, 2002.
- **US Patent Provisional:** 880619-01-US-Pro, Y. Wang, W. H. Zhong*, and B. Li, “Functionalized Porous Polymer Nanocomposites and Methods Thereof”, 2014.
- **US Patent provisional:** 61/902,117-US-Pro, W. H. Zhong*, “A Method for Conversion of Dry Nanomaterials into Liquid Nano-Agents for Fabrication of Polymer Nanocomposites and Fiber Reinforced Composites”, 2014.
- **US Patent Provisional:** 62073871-01-US-Pro, Y. Wang and W.H. Zhong, “Adhesive Conductive Binders for Battery Electrodes”, Provisional application 2014;
- **US Patent provisional:** 61/920,455-US-Pro, Y. Wang, W. H. Zhong*, “Block Copolymer Nanostructures Formed by Disturbed Self-assembly and Uses Thereof”, 2014.
- **US Patent provisional:** Y. Wang, T. Woodland, D. Mackay, and W.H. Zhong, “Sealed Battery Electrodes by Adhesive Electrolyte”, WSU, 1389--CEA-OC, 2013.
- **US Patent provisional:** 61/371,229-US-Pro, W.H. Zhong*, T. Liu and W. Wood, “Dielectric Properties as an Indicator of Structural Integrity in Nanocomposite Materials”, WSU, 1143-OIPA-OC, 2010.
- **US Patent provisional:** 61/424,155B-US-Pro, Li and W.H. Zhong*, “Highly Conductive and Damping Capable Polymer/graphitic Carbon Nanofiller Composites via a Novel Flexible Conjugative Copolymer Modification”, 1163-OIPA-OC, 2010.

- **US Patent provisional:** 61/163,144-US-Pro, B. Li, G. Sui and W.H. Zhong*, “Nanocomposite Metamaterials”, filed, 1026-OIPA-OC, 2009.
- **China Patent:** No.99,111,576.7, W.H. Zhong, B.Z. Jang, and W. Hung, “Improved Layer Manufacturing Apparatus and Process”, 2004.

ENGINEERING CONSULTING SERVICES

- The Boeing Co, Commercial Airplanes, Seattle, WA, USA, January 2006-present
- Tian-Tai Carbon Fiber and Carbon Composites, limited Inc., Shandong Province, China, 1997-2001
Responsible for technical evaluation for carbon fibers and carbon composite materials
- Lu-Xiang Highway Construction Materials Inc., Guangdong Province, China, 1999-2001
Responsible for technical evaluation for polymers used in highway pitch materials to extend the highway lifetime
- Xin-Mou Graphite Fiber and SiC Fiber Co., Hebei Province, China, 2000-2001
Responsible for technical issues of graphite fiber and SiC fiber processing

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

- American Society for Composites (ASC)
- Society for the Advancement of Materials and Process Engineering (SAMPE)
- American Society for Engineering Education (ASEE)
- American Chemical Society (ACS)
- American Association for the Advancement of Science (AAAS)
- Materials Research Society (MRS)

PROFESSIONAL SERVICE ACTIVITIES

WSU:

- Department: MME School Graduate Student Committee (2007-2010)
Laboratory and Computing Committee (2007-2009)
MME School Safety Committee, (2008-present)
MME School Undergraduate Studies Committee (2009-present)
- College: CEA College Dean’s Research Committee (2007-present)
- University: Member, Graduate Women in Science (2007-present)

NDSU:

- Department: Member, Graduate Committee (2004 – 2007)
Member, Materials Curriculum Group (2004 – 2007)
Member, Faculty Search Committee (2004-2005) (Adhoc)
- College: Member, Public Events and College Relations (2004-2007)
Chair, Research Committee (2006-2007)
- University: Reviewer: Award evaluation: Evaluated the nomination for the 2005-2006 NDSU College of Business Research Award

PUBLICATIONS

Book:

1. **W. H. Zhong**, B. Li, R. G. Maguire, V.T. Dang, G. Gross, J. Shatkin, M. C. Richey, *Nanoscience and Nanomaterials: Synthesis, Manufacturing and Industry Impacts*, published in July 2011, DEStech publications, Inc.

Book Chapters:

1. **W. H. Zhong**, C. A. Ulven, C. Park, R. G. Maguire, J. H. Kang and G. Sauti, “Polymer Nanocomposites and Functionalities” in “Encyclopedia of Nanoscience and Nanotechnology” 2nd edition”, Edited by H. S. Nalwa, Los Angeles CA: American Scientific Publishers. Published, January 2011.
(Editor’s words: The 1st ed of the *Encyclopedia of Nanoscience and Nanotechnology*, 10-Volume Set, ca.10,000 pages (www.aspbs.com/enn) (Edited by H. S. Nalwa, Foreword by Professor Richard E. Smalley, Nobel Prize Laureate, Endorsed by Professor Jean-Marie Lehn, Nobel Prize Laureate) published by American Scientific Publishers (www.aspbs.com) received the “2005 Best Reference Work Award” of the American Society for Engineering Education (USA) and was also selected as the “2005 Outstanding Academic Title” by the CHOICE magazine from the American Library Association).
2. **W. H. Zhong**, Y. Fu, S. Jana, A. Salehi-Khojin, A. Zhamu and M.T. Wingert, Wettability Behavior and Adhesion Properties of a Nano-epoxy Matrix with Organic Fibers, in the book: *Contact Angle, Wettability and Adhesion, Vol. 6, 359-376, K.L. Mittal, ed., VSP/Brill Academic Publishers. In., Leiden, the Netherland, 2009.*
3. **W.H. Zhong**, R.G. Maguire, S. S. Sangari, P. H. Wu, “Major Trends in Polymeric Composites Technology” in the book “*Composite Materials Research Progress*” Ed. L.P. Durand. New York: Nova Science Publishers, Inc., 2008. p. 109-128.
4. **W.H. Zhong**, Y. Fu and C.M. Lukehart, “Liquid Nano-Reinforcement: A Reactive Nano-Epoxy with Carbon Nanofibers for Application as a Composite Matrix” in the book “*Advances in Nanotechnology*” Vol 8, ISBN 978-1-61324-062-5, Editors: Zacharie Bartul and Jerome Trenor, Chapter 3, Nova Science Publishers. Inc, New York, Published, March 2011.

Peer-Reviewed Journal Papers:

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Recently Invited Talks/Seminars/Workshops:

1. **W. H. Zhong** and Y. Wang, Flexible and Safe Battery Materials for Next Generation Conformable Electronics and Power Sources, June 26, 2015, Nanjing University of Science and Technology, Nanjing, Jiangsu Province, China.
2. **W. H. Zhong**, Several Nanocomposite Technologies Applicable in Industry, July 10, 2015, Suzhou Institute of Nanotechnology, Suzhou, Jiangsu Province, China.
3. **W. H. Zhong** and Y. Wang, Flexible and Safe Battery Materials for Next Generation Conformable Electronics and Power Sources, November 10, 2014, University of Jinan, Jinan, Shandong Province, China.
4. **W. H. Zhong**, Industry Applicable Nanotechnology for Next Generation Composites via Energy Efficient Manufacturing, November 4, 2014, University of Idaho, Moscow, ID
5. **W. H. Zhong**, Industry Applicable Nanotechnology for Next Generation Composites, Advanced Materials Conference, September 19-21, 2014, Xi An, China
6. **W. H. Zhong**, Industry Applicable Nanotechnologies: Approaches to Enhancing Quality and Stability of Nano-systems, Quantitative Assessment Tools and a Gummy Electrolyte for Safe LiBs, SPE Auto Composites Conference and Exhibition (ACCE), September 8-11, 2014, Novi, MI. (Keynote talk)
7. **W.H. Zhong**, Reduced Viscosity Nanotechnology Leading to Enhanced Mechanical Properties and Lower Viscosity for Improved Infusion Processing of Composites, SPE Auto Composites Conference and Exhibition (ACCE), September 8-11, 2014, Novi, MI.
8. **W. H. Zhong**, Nanotechnologies Applicable in Industries: Approaches to Enhancing Quality and Stability of Nano-systems and Quantitative Assessment Tools, Beijing University of Chemical Technology, Beijing, China, July 1, 2014
9. **W. H. Zhong**, Industry Applicable Nanotechnology and Energy Efficiently Manufacturing Advanced Composites with Nanomaterials, Tongji University, Shanghai, China, July 7, 2014.
10. **W. H. Zhong**, Nanotechnologies Applicable in Industries: Approaches to Enhancing Quality and Stability of Nano-systems and Quantitative Assessment Tools, Sichuan University, Chengdu, Sichuan Province, China, July 10, 2014.
11. **W. H. Zhong**, R. G. Maguire, B. Li, Nano-Material Technologies for Next Generation Composites Applicable in Aerospace and Automotive Industries, Nanomaterials for Industry, San Diego, CA, April 6-9, 2014. (Keynote talk)
12. **W. H. Zhong**, Ultra-elastic Bio-battery Materials for Next Generation Flexible Electronics and Power Sources, Ningbo Institute of Materials Technology and Engineering, Ningbo, Zhejiang Province, China, December, 25, 2013.
13. **W. H. Zhong**, Polymer Nanocomposites in Energy and Aerospace Applications, Purdue University, West Layette, IN, November 18, 2013
14. **W. H. Zhong**, High Performance Polymeric Electrolytes for Safe Lithium-ion Batteries, 246th ACS International Meeting and Exhibition, Indianapolis, IN, September 8-12, 2013.
15. **W. H. Zhong**, For More Energy Efficient RI Processing of Structural Composites: A “Nano-Nectar” (Liquid Nano-Reinforcement) Technology Leading Epoxy to High Performance and Low Viscosity,

Aerospace Engineers Association, Seattle, WA, June 15, 2013.

16. **W. H. Zhong**, Solid Polymeric Electrolytes for Safer Higher Performance Lithium Ion Batteries, Critically Needed for Commercial Aircraft, invited by SAMPE Seattle Chapter, Seattle, March 26, 2013.
17. **W.H. Zhong**, Flexible Bio-battery Materials -Solid polymer electrolytes (SPEs) and Li-ion battery safety issues, University of British Columbia, Vancouver, BC, Canada, February 7, 2013.
18. **W. H. Zhong**, Flexible Bio-battery Materials for Next Generation Foldable/Conformable Electronics and Power Sources, Beijing University of Chemical Engineering, January 3, 2013.
19. **W.H. Zhong**, Ultra-elastic Electrolytes for Foldable/Conformable Electronics and Power Sources, Beihang University, Beijing, China, January 4, 2013.
20. **W. H. Zhong**, Enhancing Mechanical Performances while Reducing Manufacturing Cost for Advanced Structural Composites Using “Liquid Nano Reinforcement”, Beihang University, Beijing, China, January 4, 2013.
21. **W.H. Zhong**, Nanocomposite Materials for Aerospace and Energy Applications, for WA Legislative Committee on Economic Development & International Relations: Creating New Economic Possibilities through the Development of Innovative Composite Materials, Tacoma, WA 98421, September 21, 2012.
22. **W.H. Zhong**, Simultaneously Enhancing Ionic Conductivity and Mechanical Properties of Solid Polymer Electrolytes via a Copolymer as Multi-Functional Filler, Next Generation Batteries, Boston, MA, July 19-20, 2012.
23. **W.H. Zhong**, Soy Protein-based Ultra Elastic Polymeric Electrolyte, Next Generation Batteries, Boston, MA, July 19-20, 2012.
24. **W. H. Zhong**, Novel Nanotechnology for Boeing Airplane Applications: Nano-nectar Tech for Multifunctional Coatings/Primers/Surfacing/Films; Bi-layer Conductive Nanocomposite Films/Coatings with High Static Dissipation Efficiency; Dielectric Approach for Damage Detection in Composites and Nanocomposite Parts, Everett, WA, January 17, 2012.
25. **W.H. Zhong**, Enabling Faster Resin Infusion Processing of Automotive Composites, invited by ASM Spokane Chapter, Spokane, WA, January 10, 2012.
26. A. Tangpong and **W. H. Zhong**, Tribological and Mechanical Properties of Nanocomposites with PE Materials, Biomedical Engineering Seminar, Mayo Clinic, Rochester, Minnesota, October 21, 2011.
27. **W.H. Zhong**, “Enabling Faster Resin Infusion Processing of Automotive Composites: A “Nano-Nectar” Technology Leading Epoxy to High Performance and Low Viscosity”, SPE Automotive Composites Conference and Exhibition, Troy, Michigan, September 13-15, 2011.
28. **W. H. Zhong**, “Enhancing mechanical properties of epoxy resin while reducing viscosity using “liquid nano-reinforcement”, 2011 Nanotech International Conference, Boston, June 13-17, 2011
29. **W. H. Zhong**, “Nanocomposites for Industry Application”, (2-hour course) invited by the Boeing Co. in Renton and Everett, WA. March 29-30, 2011.
30. **W.H. Zhong**, “Nanofibers (GNF-ODA) for High Performance Structural Composites at Boeing Fiber Workshop: The Importance of the New Fibers in a Composite Function”, Everett, WA, July 22-24, 2008.
31. **W.H. Zhong**, “Polymer Nanocomposites and Functionalities”, (2-days/16-hour Course) at Boeing Co, Everett, WA, June 2-3, 2008.
32. **W.H. Zhong**, “Challenging Issues for Development of Nanocomposites”, at Washington State University (School of Mechanical & Materials Engineering), February 7, 2008.
33. **W.H. Zhong**, “Nanofiber Reinforced Epoxy Composites and Their Ageing Properties”, PNNL, Richland, WA, January 25, 2008.

34. **W.H. Zhong**, “Nanotailored Carbon Fibers Interchange -New Generation Carbon Fiber Technology” Workshop, Air Force Institute of Technology Facility, Dayton, OH, November 6-7, 2007.
35. **W.H. Zhong**, “High Temperature BMI Resin, Increased Durability VARTM Composite Parts and Durable Repair Resins”, Brainstorming Proposed Projects for AMTAS FAA, Seattle, WA, October 25, 2007.
36. **W.H. Zhong**, “Preparation and Properties of Nano-epoxy as a Composite Matrix for Space Radiation Shielding”, at Washington State University (Chemistry Dept), October 5, 2007
37. **W.H. Zhong**, “Multi-functional Nanocomposites and Nanofoam”, in Industry Symposium on Micro & Nano Scale Cellular Polymers, at University of Washington, Seattle, WA, August 16-17, 2007.
38. **W.H. Zhong** and J. Miller, “Reactive Nano-Epoxy Matrix and the UHMPWE Fiber Composites for Cosmic Radiation Shielding”, Smart Materials and Nanotechnology in Engineering (SMN 2007)”, Harbin, China, July 3, 2007.
39. **W. H. Zhong**, “Processing and Properties of Nanocomposites with high Performance”, at Beijing University of Chemical Technology, Beijing, China, June 22, 2007
40. **W.H. Zhong**, “Development of Nanocomposites for Cosmic Radiation Shielding”, At University of Alabama, Birmingham, AL, February 7, 2007.
41. **W.H. Zhong**, “Challenging Issues for Development of High Performance Nanocomposites – Preparation of Nano-Epoxy”, at North Dakota State University, Fargo, ND, February 21, 2007.
42. **W.H. Zhong**, “Challenging Issues for Development of Nanocomposites – Preparation of Nano-Epoxy”, at Workshop on Nanocomposites and Hybrid Materials, supported by NSF NIRT and North Dakota State University, Fargo, ND, October 6, 2006. (Organizer, invited talk)
43. **W. H. Zhong**, “Polymer Nanocomposites and Functionalities”, (5-day/30-hour Workshop) at Boeing Co, Renton, WA, July 9-13, 2006.
44. **W. H. Zhong**, “Polymer Nanocomposites and Functionalities”, (5-day/30-hour Workshop) at Boeing Co, Everett, WA, July 16-20, 2006.
45. **W.H. Zhong**, “Electrical Conductivity: Nano-Fillers and Nanocomposites”, at the Boeing Company, Everett, WA, January 13, 2006.
46. **W.H. Zhong**, “Properties of Nano-matrix and Characterization of Wettability and Adhesion for UHMWPE Fiber/Nano-Matrix”, at the Boeing Company, Everett, WA, November 3, 2005.
47. **W.H. Zhong**, “Preparation of Nano-Matrix for Enhanced Composite Fiber/Matrix Adhesion & Sensitivity of Properties to Processing Parameters”, at the Boeing Company, Everett, WA, November 3, 2005.

Peer Review Conferences

1. **W. H. Zhong**, Industry Applicable Nanotechnologies: Approaches to Enhancing Quality and Stability of Nano-systems, Quantitative Assessment Tools and a Gummy Electrolyte for Safe LiBs, SPE Auto Composites Conference and Exhibition (ACCE), September 8-11, Detroit, MI. (Keynote talk)
2. **W.H. Zhong**, Reduced Viscosity Nanotechnology Leading to Enhanced Mechanical Properties and Lower Viscosity for Improved Infusion Processing of Composites, SPE Auto Composites Conference and Exhibition (ACCE), September 8-11, Detroit, MI. (Invited talk)
3. H. Souzandeh, Y. Wang, A.W. Eyler, **W.-H. Zhong**, Protein-Based Nanocomposites: A Study on the Interactions Between Denatured Soy Protein and Poly(Ethylene Oxide), SAMPE, June 2-5, 2014, Seattle, WA.

4. A.W. Eyler, Y. Wang, H. Souzandeh, **W.H. Zhong**, Control of the Morphology Structures of Protein-Based Nanocomposites, SAMPE, June 2-5, 2014, Seattle, WA
5. **W. H. Zhong**, R. G. Maguire, B. Li, Nano-Material Technologies for Next Generation Composites Applicable in Aerospace and Automotive Industries, Nanomaterials for Industry, San Diego, CA, April 6-9, 2014. (Abstract and Presentation/Keynote talk)
6. S. Xu, A. Akchurin, T. Liu, W. Wood, X.W. Tangpong, I. Akhatov, and **W. H. Zhong**, “Thermal and Wear Analysis of HDPE/CNF Nanocomposites in Dry Sliding Contact With a Steel Ball,” IMECE2013-64963, 2013 ASME International Mechanical Engineering Congress and Exposition, San Diego, CA, November 15-21, 2013. (Presentation only)
7. S. Xu, A. Akchurin, T. Liu, W. Wood, X.W. Tangpong, I. Akhatov, and **W. H. Zhong**, “An Energetic Approach for Wear Prediction of HDPE/CNF Nanocomposites In Dry Sliding Contact with A Steel Ball,” IMECE2013-67010, Poster presentation, Society-Wide Micro and Nanotechnology Forum, 2013 ASME International Mechanical Engineering Congress and Exposition, San Diego, CA, November 15-21, 2013 (Poster only)
8. B. Deacon, **W.H. Zhong** and B. Lively (presenter), Mechanical Performance of Kevlar Fabric/carbon Nanofiber Modified Epoxy Composites Made via Vacuum Assisted Resin Transfer Molding, SAMPE, Wichita, KS, Oct 20-24. 2013.
9. A. Akchurin, S. Xu, X.W. Tangpong, T. Liu, W. Wood, and **W. H. Zhong**, “Nanoscale Characterization of Wear Particles Produced from CNF-Reinforced HDPE Composites,” IMECE2012-86149, ASME International Mechanical Engineering Congress and Exposition, Houston, TX, November 9-15, 2012.
10. S. Xu, A. Akchurin, X.W. Tangpong, T. Liu, W. Wood, and **W. H. Zhong**, “Comparison of Tribological Performances of High Density Polyethylene Enhanced with Carbon Nanofibers,” IMECE2012-86150, ASME International Mechanical Engineering Congress and Exposition, Houston, TX, November 9-15, 2012.
11. J. Y. Ji and **W.H. Zhong**, Simultaneously Enhancing Ionic Conductivity and Mechanical Properties of Solid Polymer Electrolytes via a Copolymer as Multi-Functional Filler, Next Generation Batteries, Boston, MA, July 19-20, 2012. (abstract and invited talk)
12. J. Y. Ji and **W.H. Zhong**, Soy Protein-based Ultra Elastic Polymeric Electrolyte, Next Generation Batteries, Boston, MA, July 19-20, 2012. (abstract and invited talk)
13. B. Lively, P. Smith and **W.H. Zhong**, Stereological Macrodistribution Analysis: Industry Applicable Quality Assessment of Nanocomposite Materials and Parts, SAMPE, Baltimore, MD May 21-24, 2012, (Student Research Symposium 2012 Finalist – Oral Competition Honorable Mention)
14. W. Wood and **W. H. Zhong**, Effect of paraffin concentration on dispersion, mechanical, and tribological properties of extruded UHMWPE-CNF composites, *SPE-ANTEC 2012 Meeting*, Orlando, FL, April 2nd, 2012. (Abstract)
15. **W.H. Zhong**, “Enabling Faster Resin Infusion Processing of Automotive Composites: A “Nano-Nectar” Technology Leading Epoxy to High Performance and Low Viscosity”, SPE Automotive Composites Conference and Exhibition, Troy, Michigan, September 13-15, 2011.
16. B. Li and **W.H. Zhong**, Flexible Sulfonated Poly(etherketoneketone) Foam for Energy Efficient Applications, World Materials Summit, organized by MRS, October 8-12, 2011, Washington DC. (B. Li was selected as one of the top 50 PhD students/postdocs in the world to attend the conference; poster)
17. E. Olson, B. Li and **W.H. Zhong**, Effect of Surface Treatment of Graphite Nanoplatelet on Damping Properties of Polyetherimide Nanocomposites, 161st Conference of the Acoustical Society of America, May 23-25, 2011, Seattle, WA. (Invited: abstract and oral presentation).
18. J. Y. Ji, B. Li and **W.H. Zhong**, A Solid Polymer Electrolyte with Comprehensively Enhanced Performance for Lithium Ion Battery, 2011 AIChE Annual Meeting, Minneapolis, MN, October 16-21, 2011. (poster)
19. J.Y. Ji, J. Keen and **W.H. Zhong**, Improvement in Ionic Conductivity and Mechanical Properties

- Observed In Multi-Functional Block Copolymer Modified Solid Polymer Electrolytes for Li⁺ Ion Batteries, 2011 AIChE Annual Meeting, Minneapolis, MN, October 16-21, 2011. (oral presentation and abstract)
20. J. Y. Ji and **W. H. Zhong**, A Solid Polymer Electrolyte with Comprehensively Enhanced Performance for Lithium Ion Battery, World Materials Summit, organized by MRS, October 8-12, 2011, Washington DC. (J.Y. Ji was selected as one of the top 50 PhD students/postdocs in the world to attend the conference; poster)
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 24. **W. H. Zhong**, Enhancing Mechanical Properties of Epoxy Resin While Reducing Viscosity Using “Liquid Nano-Reinforcement”, Nanotech 2011, June 13-17, 2011, Boston, MA.
 25. S. Xu, S., A. Akchurin, X.W. Tangpong, I. Akhatov, T. Liu, W. Wood and **W.H. Zhong**, Tribological behavior of High density polyethylene nanocomposites with Silane Treated Carbon Nanofibers, *ASME International Mechanical Engineering Congress and Exposition*, Denver, CO, November 11-17, 2011.
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