**JINDE ZHANG**

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**SUMMARY**

* Solid background in diverse fields including chemistry, polymer science and plastics engineering.
* Strong expertise in the field of bio-inspired engineering surfaces with special wetting behavior including superhydrophobicity, superomnipobicity, superhydrophilicity, etc.
* Strong experience in surface functional film manufacturing by Roll-to-Roll processing.
* Strong expertise in polymer nanocomposites fabrication, such as CNTs/polyolefin, carbon blacks/polyolefin, metal power/polyolefin, graphite/polyolefin, etc.
* Strong experiences in mold design and processing control for injection molding.
* Strong experience in rheological, thermal, and mechanical properties characterizations on polymers and nanocomposites.
* Strong experience in grant proposal preparation and application.
* Excellent presentation, verbal, and written communication skills.
* Ability to work in a cross-functional team environment and have strong leadership in team works.
* Strong time management & administrative skills.

**WORK EXPERIENCES**

**Research Scientist in UMass** **Lowell**  Nov. 2018-Present

FlexTech/SEMI 2020 WPI/UML: Soft Robotic Haptic Gloves as Intuitive Human-Machine Interfaces to Augment Human Performance (CO-PI) Jun. 2021-Dec. 2022

* This 18-month project will develop and demonstrate a manufacturable, washable, soft robotic haptic glove prototype consisting of a stretchable textile equipped with integrated sensors to track finger, palm and arm motion and an integrated pneumatic system to provide force feedback
* UML will focus on the developing elastic pneumatic muscle subsystem.

CCDC-SAFR: Environmental-friendly superhydrophobic coating (CO-PI) Feb. 2021-Feb. 2022

* Develop environmentally friendly superhydrophobic coatings for military applications
* Perform tests of corrosion-resistance, drag-reduction and ice adhesion on developed formulation

SLIMMER BB-5: Superhydrophilic coating for anti-fogging (CO-PI) Sep. 2018-Jun. 2021

* Investigate the effect of composition and topography on surface wetting property
* Develop durable superhydrophilic coating for anti-fogging application

SLIMM CB-1: Multilayer elastomer laminates for chemical protective clothing (CO-PI) Sep. 2017-Jun. 2020

* Develop novel rubber laminate to provide excellent chemical protection
* Scale up the processing to fabricate validated rubber laminate.

EFRI C3 SoRo: Textile Robotics: Integrative Design, Modeling, Manufacture, and Control of Soft Human-Interactive Apparel Sep. 2018-Aug. 2022

* Develop rubber formulation and processing for fabric coating to enrich admired airtightness to fabrics
* Develop stretchable capacitive fiber sensor, which can be later integrated into a woven textile.

ONR: Corrosion, biofouling, and hydrodynamic behavior as a function of topology and composition of superhydrophobic topcoat Sep. 2016-Dec. 2019

* Correlate the surface topography with the anti-corrosion, anti-biofouling, and drag-reducion in the existing UML/Shenkar topcoat system

SLIMM CB-2: Icephobic and superomniphobic coatings for warfighter protection Sep. 2017-Jun. 2020

* Investigate the manufacturing (polymer binder) and the role of topography in icephobic coatings
* Study the manufacturing of nanoscale embossed omniphobic structures that have optical clarity

**Postdoctoral Researcher in UMass** **Lowell**  Jun. 2015-Nov. 2018

Nanomanufacturing of Functional Surface Materials

* Tooling fabrication by lithography approach.
* DOE on roller embossing process in order to transfer/replicate the micro-features of tooling onto polymer film or sheet.
* Subsequently shaping the transferred features into desired geometry.
* Polymer sheet or film with specified micro-patterns on surface can have extraordinary properties and applications, such as super-hydrophobicity, super-omniphobicity, light enhancement, self-cleaning, etc.

Fabricating breathable and stretchable membrane with superhydrophobic property by electro-spinning

* R&D on rubber compound formulation.
* DOE on solution electrospinning process to fabricate nonwoven membrane with controllable fiber geometry.
* The permeability was controller by fiber geometry and chemistry of rubber compound.
* Specific treatment on the fibers surface gave the membrane additional function like self-cleaning.

**Research Assistant in UMass Lowell** Aug. 2011-June. 2015

Rheological characterization on high performance adhesive PU

* Sponsored by Triton.
* Comprehensive study on the rheological properties of new PU adhesive, like detecting significant thermal transitions, finding proper using temperature range, conducting structure analysis and so on.
* Providing supporting data for new adhesive design, which can be used in packaging, composite assembly and so on.

High performance engineering material development- CNS filled PC/ABS

* Sponsored by Lockheed Martin.
* Novel design on screw, feed approach and compounding formulation were performed.
* Machinery, processing control and troubleshooting.
* Developed new materials for EMI applications with high mechanical performances.

High thermal and electrical conductive material development

* Sponsored by Parker Hannifin.
* Developed new materials and prototype for thermal conductive coupling elements applications.

Starch citrate-chitosan foam manufacturing via twin screw extrusion

* Sponsored by company Tethis.
* Design on reactive twin screw extrusion manufacturing line for crosslinked reaction.
* Processing control and troubleshooting.
* Developed high-value foam gel materials with unique absorptive and mechanical properties from starch citrate-chitosan.

Fabrication of UMHDPE film reinforced by high loading of carbon black

* Sponsored by Liso.
* Developed new materials formulation specifically for UMHDPE compounding.
* Designed novel feeding approach to achieve 90 wt. % loading of carbon black.
* Manufactured high quality sheet by directly extrusion filming.

Research and development on new rubber compounding with high traction

* Sponsored by Vibram.
* Comprehensive study about the relationship between the formulation, structure and properties around rubber compounds.
* Designed novel formulation specific for traction improvement.
* Compounding, molding and testing were carried out to validate the formulation.

**SKILLS**

***Synthesis:***  Organic and inorganic nano-particles fabrication via emulsion method, inorganic/organic hybrid microspheres fabrication, superparamagnetic nano-composites synthesis, super hydrophobic membrane fabrication via emulsion polymerization.

***Processing*:** Injection molding (Arburg & Sumitomo), Rubber injection molding, Twin-screw extrusion compounding (Leistritz & Technovel), Thermoforming, Compression molding, Rubber compounding (Banbury), Two roll mill, Internal batch mixer (Brabender).

***Characterization:*** Scanning electron microscopy (SEM), Transmittance electron microscopy (TEM), Fourier Transform Infrared spectroscopy (FT-IR), Nuclear magnetic resonance spectroscopy (NMR), X-ray Diffraction (XRD), Impact Strength (Charpy & Izod), Tensile Testing (Static and Dynamic) (Instron), Dynamic Mechanical Analysis (DMA), Differential Scanning Calorimetry (DSC), Thermo Gravimetric Analysis (TGA), Capillary Rheometer, Rotational rheometer (ARES), Mold Flow Index Analysis (MFI),Coefficient of Friction,Hardness (Shore), Rebound Resilience.

***Software:*** Moldflow, Moldex 3D, Solidworks, Origin, Photoshop, Microsoft Office Suite.

**EDUCATION**

**Doctor of Philosophy (Ph.D.): Plastics Engineering** Jun. 2015 University of Massachusetts, Lowell, MA, USA. GPA: 3.80/4.0 ***Thesis:*** Impact of recycling on CNTs-filled polymers Advisor: Dr. Joey Mead

**Master of Science: Polymer Physics & Chemistry** Jul. 2011 University of Science and Technology of China, Hefei, Anhui, China. GPA: 3.90/4.0 ***Thesis:*** The fabrication of superparamagnetic organic/inorganic hybrid microspheres via emulsion approach. Advisor: Dr. Huarong Liu

**Bachelor of Science: Applied Chemistry** Jul. 2007 Xidian University, Xi’an, Shanxi, China. GPA: 3.4/4.0

### PUBLICATIONS

* **J. Zhang**, A. Panwar, D. Bello, T. Jozokosd, J. A. Isaacs, C. Barry, J. Mead, “The effects of recycling on the properties of carbon nanotube-filled polypropylene composites and worker exposures”, *Environmental Science: Nano*, 2016, 3, 409-417.
* **J Zhang**, A Panwar, D Bello, JA Isaacs, T Jozokos, J Mead, “The effects of recycling on the structure and properties of carbon nanotube-filled polycarbonate”, *Polymer Engineering & Science*, 2018, 58 (8), 1278-1284**.**
* **J Zhang**, H Liu, “A novel approach to preparing polystyrene/Fe3O4 multihollow microspheres with porous walls”, *Colloid and Polymer Science*, 2016, 294 (11), 1755-1763.
* **J. Zhang**, A. Panwar, C. Barry, and J. Mead, “Effect of Reprocessing on Mechanical Properties of Polypropylene,” *ANTEC 2014 Conference & Exhibition*, April 28-30, 2014, Las Vegas, Nevada.
* **J. Zhang,** T. Nahum, A. Panwar, C. Barrry, J. Mead, “Electrospun Butyl Rubber Mats for Ice-phobic Applications”, *International Elastomer Conference*, 2015, Cleveland, Ohio.
* Y. Wang, B. Zhang, H. Dodiuk, S. Kenig, C. Barry, J. Ratto, J. Mead, Z. Jia, S. Turkoglu, **J. Zhang\*,** “Effect of Protein Adsorption on Air Plastron Behavior of a Superhydrophobic Surface”, ACS Applied Materials and Interfaces, 2021, 13(48), 58096–58103.
* K Zheng, **J Zhang**, H Dodiuk, S Kenig, C Barry, H Sun, J Mead., “Effect of Superhydrophobic Composite Coatings on Drag Reduction in Laminar Flow”, ACS Applied Polymer Materials, 2020, 2 (4), 1614-1622
* K Zheng, **J Zhang**, H Dodiuk, S Kenig, C Barry, EB Iezzi, J Mead, “The effect of composite interface morphology on wetting states for nanocomposite superhydrophobic coating”, Surface and Coatings Technology, 2020, 387, 125457.
* K Zheng, **J Zhang**, E Keaney, H Dodiuk, S Kenig, C Barry, J Mead, “The effect of superhydrophobic surface topography on underwater corrosion resistance of steel”, Journal of Coatings Technology and Research, 2021,1-9.
* N. Kodihalli Shivaprakash**, J Zhang**, A Panwar, C Barry, Q Truong, J Mead, “Continuous manufacturing of reentrant structures via roll-to-roll process”, *Appl. Polym. Sci.* 2019, 136, 46980.
* N. Kodihalli Shivaprakash, **J. Zhang**, T. Nahum, C. Barry, Q. Truong, J. Mead, “Roll-to-Roll hot embossing of high aspect ratio micro pillars for superhydrophobic applications”, *Intern. Polymer Processing,* 2019.
* P. Boonriksa, D. Bello, **J. Zhang**, J. A. Isaacs, J. L. Mead, S. R. Woskie. “Characterization of exposures to nanoparticles and fibers during manufacturing and recycling of carbon nanotube reinforced polypropylene composites”, *Annals of Occupational Hygiene*, 2016, 60 (1): 40-55.
* P. Boonriksa, D. Bello, **J. Zhang**, J. A. Isaacs, J. L. Mead, S. R. Woskie. “Exposures to nanoparticles and fibers during injection molding and recycling of carbon nanotube reinforced polycarbonate composites”, Journal of Exposure Science and Environmental Epidemiology, 2017, 27 (4), 379.
* F.W. Wang, H.R. Liu, **J. Zhang**, X.T. Zhou, X.Y. Zhang, “Synthesis of snowman‐like magnetic/nonmagnetic nanocomposite asymmetric particles via seeded emulsion polymerization initiated by γ-ray radiation”, *Journal of Polymer Science Part A: Polymer Chemistry*, 2012, 50(22): 4599-4611.
* T. Li, H. Liu, L. Zeng, S. Yang, Z. Li, **J. Zhang** and X. Zhou, “Macroporous magnetic poly(styrene–divinylbenzene) nanocomposites prepared viamagnetite nanoparticles-stabilized high internal phase emulsions”, *J. Mater. Chem*., 2011, 21, 12865-12872.
* T Gu, A Meesrisom, Y Luo, QN Dinh, S Lin, M Yang, A Sharma, R Tang, **J Zhang**, Z Jia, P Millner, A Pearlstein, B Zhang, “Listeria monocytogenes biofilm formation as affected by stainless steel surface topography and coating composition”, Food Control, 2021, 130, 108275.
* JL Mead, CMF Barry, J Shearer, A Panwar, **J Zhang,** “Methods and system for mass production, volume manufacturing of re-entrant structures”, 2016, *US Patent*. 15/159,428

### SERVICE ACTIVITIES

* ***Committee member*** of PhD thesis work for Keqing Zheng from Umass Lowell Sep. 2019
* ***Committee member*** of PhD thesis work for Yujie Wang from Umass Lowell Aug. 2021
* Outreach Program, University of Massachusetts, Lowell, MA Nov. 2013

Demonstrated rod extrusion, impact testing & experiments on hydrophobicity to high school students.

* NH Techfest, Windham High School, Windham, NH Oct. 2013

Informed students & parents about educational & career opportunities through Plastics Engineering at UMass Lowell with an aim of recruiting into the program.

* Region IV Middle School Science & Engineering Fair, Lowell, MA May. 2013, 2014, 2015, Evaluated & assessed technical projects and interviewed students.
* Nanodays volunteers in museum of science, Boston, MA Apr. 2013, 2015
* Hosting the Polymer Processing Society international conference in Boston Nov. 2018
* **Article reviewer**, RSC Advances, “Developing highly conducting and mechanically durablestyrene butadiene rubber composites with tailored microstructural properties by the incorporation of ionic liquid modified CNT”, March 2016.
* **Article reviewer**, ACS Macro Letters, “Superhydrophobic properties of nanotextured polypropylene foils fabricated by roll–to–roll extrusion coating”, June 2016.
* **Article reviewer**, Rubber Chemistry & Technology, “Investigation on different crosslinking methods of EOC: PDMS TPEs for cable insulation application with special reference to thermal, rheological, creep and electrical properties”, September 2016.
* **Article reviewer**, Carbonate Polymers, “Alkali Cellulose/Metal Oxide Composites: Synthesis and Structural Transformation”, June 2016.
* **Article reviewer**, Journal of Colloid and Polymer science, “Soft multiple emulsions demonstrating reversible freeze-thawing capacity and enhanced skin permeability of diclofenac sodium”, November 2017.
* **Article reviewer**, Industrial & Engineering Chemistry Research, “Enhanced mechanical performance and antioxidative efficiency of styrene-butadiene rubber via 4-aminodiphenylamine functionalized mesoporous silica”, March 2018.
* **Article reviewer**, Nature Sustainability, “Recyclable thermoset hyperbranched polymers containing a reversible hexahydro-s-triazine structure”, September 2019.