

NARENDIRAN VITCHULI

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• **Senior Scientist** • **Research Engineer** • **Fiber Polymer Scientist**

RESEARCH PROFILE

Senior Scientist with proven track record in accomplishment of Technology Transfer Project of novel liquid shear method into commercial scale up process, collaborating between a Startup Company and University. Extensive research work experience in liquid shear nanofabrication of polymeric materials, plasma surface modification, electrospinning, functional material fabrication for Chemical/Biological warfare aerosol detoxification, air/liquid filtration applications, polyurethane microcapsule synthesis by interfacial polycondensation reaction and nanomaterials characterization. Strong fundamental knowledge in Polymer Science, Fiber materials, and impressive research achievements with several published peer-reviewed articles and award winning presentations.

EDUCATION

- **Ph.D.** in Fiber Polymer Science, **North Carolina State University**, Raleigh, NC **08/2008 to 08/2011**
- **M.S.** in Fiber Polymer Science, **Indian Institute of Technology Delhi**, India **07/2006 to 06/2008**
- **B.S.** in Textile Engineering, **A. C. Tech., Anna University**, Chennai, India **07/2002 to 05/2006**

PROFESSIONAL & RESEARCH EXPERIENCE

- **XANOFI INC., Raleigh, NC** **Aug. 2013-Present**
Senior Scientist
 - ✓ Nanofiber based product development from bio and synthetic polymers, nanofiber quality improvement, product applications in food, filtration and tissue engineering products.
 - ✓ Practiced project management skills to deliver results on multiple projects working with team.
- **XANOFI, INC. and NORTH CAROLINA STATE UNIVERSITY Raleigh, NC** **Aug. 2011–Aug. 2013**
Post-Doctoral Researcher, Chemical & Bio-molecular Engineering

Contributed as a lead research scientist collaborating between Startup Company Xanofi Inc and NC State University, on technology transfer project of liquid shear nanofabrication process.

 - ✓ Accomplished liquid shear nanofabrication process development from lab scale to commercial XanoShear™ and optimized critical process parameters to produce nanofibers at > 3 kg/hr. rate.
 - ✓ Developed liquid shear nanofiber products from variety of polymers for air/liquid filtration, acoustics, and smart materials applications and characterized their functional properties.
 - ✓ Successful track record in writing research proposal, mentoring project team, and collaborating with interdisciplinary academic cum industrial research groups.
- **NORTH CAROLINA STATE UNIVERSITY, Raleigh, NC** **Aug. 2008 – Aug. 2011**
Graduate Research Assistant, Fiber Polymer Science

Dissertation: *Atmospheric Plasma-Electrospinning Hybrid Processing for Protective Applications*

 - ✓ Designed and constructed “*Plasma-Electrospinning*” hybrid process set up and performed plasma surface modification of polymer nanofibers to increase their adhesion on substrate over 400%.
 - ✓ Successfully fabricated Zinc Oxide-Nylon6 multifunctional composite nanofibers, characterized functionalities for chemical warfare detoxification (>95%) and antibacterial (99.99%) properties.
 - ✓ Planned, conducted experiments to improve filtration efficiency (>99.9%) of military protective fabric by coating electrospun Nylon6 nanofibers, against chemical biological warfare aerosols.
- **INDIAN INSTITUTE OF TECHNOLOGY DELHI, India**

Research Assistant Fiber Polymer Science**Jul. 2006 – Jun. 2008**Thesis: *Microencapsulated Flame Resistant Finish*

- ✓ Succeeded in microencapsulation of flame resistance (FR) phosphate compound with interfacial polycondensation polymerization of polyurethane shell and achieved FR property by applying on textiles.
- ✓ Performed in-situ microencapsulation of FR agent on substrate and LOI increase over 250% was accomplished.

TECHNICAL SKILLS**Characterization:** Anti-bacterial, SEM, GC-FID, DSC, TGA, FTIR, UV-Vis, Optical Microscopy, Aerosol Filtration TSI 3160, Rheometer, Instron, Physical Testing of Polymer Fiber & Textile materials.**Applications:** MS office, Origin Lab, Adobe Photoshop, Corel Draw.**WORK PERMIT: O-1A Status (Extraordinary Ability in Science & Education)****PATENT and INVENTION DISCLOSURE**

1. US Patent Pending: Xiangwu Zhang, Marian McCord, Mohamed Bourham, Joshua Nowak, **Narendiran Vitichuli** and Quan Shi, *Nanofibers, Nanofiber Mat and System and Method of Making Same*, US Provisional Patent filed (Application Serial No. 61/445,333), February 22, 2011.
2. Xiangwu Zhang, Marian McCord, Mohamed Bourham, Joshua Nowak, **Narendiran Vitichuli** and Quan Shi, *Atmospheric Pressure Plasma-Melt Blowing Hybrid Process for Producing Durable and High Performance Nanofibers and Nanofiber Mats*, NC State University Invention Disclosure File No. 12020.

PUBLICATION LIST

1. S. Smoukov, T. Tian, **N. Vitichuli**, O. Velez et al., Scalable liquid shear-driven manufacture of polymer nanomaterials, in review *Science*.
2. Q. Shi, **N. Vitichuli**, X. Zhang, et al., Multifunctional and durable nanofiber-fabric-layered composite for protective application, *J Appl Polym Sci* (2013), 128(2), 1219-1226.
3. **N. Vitichuli**, Q. Shi, X. Zhang et al., Plasma-Electrospinning Hybrid Process to improve adhesion of Nanofibers on Fabric, *Plasma Chem Plasma P*, 2012, **32** (2), 275.
4. **N. Vitichuli**, Q. Shi, X. Zhang et al, Atmospheric Plasma Application to Improve Adhesion of Electrospun Nanofibers onto Protective Fabric, *J Adhes Sci Technol*, 2012 Sep 1-15.
5. **N. Vitichuli**, Q. Shi, X. Zhang et al., Multifunctional Zinc Oxide-Nylon 6 Nanofiber mats by Electrospinning-Electrospraying Hybrid Process for Use in Protective Applications, *Sci Technol Adv Mater*, 2011, **12**, 055004.
6. Q. Shi, **N. Vitichuli**, X. Zhang et al., Atmospheric plasma treatment of pre-electrospinning polymer solution: A feasible method to improve electrospinnability, *J Polym Sci Pol Phys*, 2011, **49**(2), 115.
7. Q. Shi, **N. Vitichuli**, X. Zhang et al., One-Step Synthesis of Silver Nanoparticle-Filled Nylon 6 Nanofibers and Their Antibacterial Properties, *J Mater Chem*, 2011, **21**, 10330.
8. Q. Shi, **N. Vitichuli**, X. Zhang et al., Durable antibacterial Ag/polyacrylonitrile (Ag/PAN) hybrid nanofibers prepared by atmospheric plasma treatment and electrospinning, *Eur Polym J*, 2011, **47**(7), 1402.
9. Q. Shi, **N. Vitichuli**, X. Zhang, et al., A facile approach to fabricate porous nylon 6 nanofibers using silica nanotemplate, *Journal of Applied Polymer Science*, 2011, **120**(1), 425.
10. **N. Vitichuli**, Q. Shi, X. Zhang et al., Electrospun ultrathin nylon fibers for protective applications, *J Appl Polym Sci* 2010, **116**(4), 2181.

HONORS and ACTIVITIES

- Member in Sigma Xi: The Scientific Research Society
- First Prize Winner, AATCC Sixth Annual Materials Research Poster Competition, May 2011
- Student Scholarship Award, CBD S&T Conference, Florida, 2010
- Graduate Research Assistant Scholarship, NC State University, August 2008 – July 2011
- Research Assistant Scholarship, IIT Delhi August 2006 – June 2008
- Treasurer and Public Relationship Coordinator, *Twocentsofhope*, Raleigh-NC 2009-Present