Exponent®
Engineering & Scientific Consulting

Tiffany Longfield, Ph.D.

Senior Scientist | Polymers & Chemistry
Menlo Park
-+1 650-688-6709 | tlongfield@exponent.com

Professional Profile

With several years of hands-on industry experience, Dr. Longfield enthusiastically applies her materials science knowledge to understand how process and treatment impacts polymer structure and function in finished goods. She has worked on a wide variety of projects in industry and research settings - including manufacturing process development, surface preparation and cleaning efforts, polymeric accelerated aging studies, porous materials synthesis and characterization, novel polymer formulation, chemical and bacteriological water quality monitoring, and lithography failure analysis. Dr. Longfield routinely assists clients in materials-related root cause investigations for a variety of industries, including consumer products, consumer electronics, automotive, medical devices, utilities, and food packaging.

As a trained chemist and materials scientist, Dr. Longfield has extensive experience in characterization techniques including microscopy (optical, SEM, TEM), porosimetry (N2 sorption, Hg intrusion), contact angle measurement (goniometry), elemental analysis (EDS, TOF-SIMS, AAS, Auger), spectroscopy (FT-IR, Raman, UV-Vis), mass spectrometry (GC-MS, ICP-MS), thermal analysis (TGA, DSC), and surface profilometry (interferometric, contact) to investigate various properties of materials and structures. She has experience with a wide array of materials including semiconducting polymers (PEDOT:PSS, resorcinol formaldehyde), porous materials, nanomaterials (carbon nanotubes, hexagonal boron nitride, nanoparticle dispersions), catalytically graphitized carbons, biomaterials, nanohybrid materials, and commercial polymer formulations [elastomers (EPDM, silicone, NBR), thermosetting polymers (epoxy, polyurethane), and thermoplastics (HDPE, Nylon, PTFE, PET, PVDF, PP)]. Additionally, Dr. Longfield is well-versed in various surface preparation methods including wet cleans, plasma treatment, UV-ozone cleaning, and CO2-based particle removal and has industry experience in troubleshooting yield issues resulting from incomplete/faulty surface preparation.

Prior to joining Exponent, Dr. Longfield worked in the semiconductor industry as a process technology development engineer. There, she specialized in wet clean-based surface preparation of optical/EUV photomasks used in high-volume manufacturing. She also worked at Sandia National Laboratories as a staff scientist, where she studied polymer aging behavior over time, and performed formulation work to create novel filled fluorosilicones and foams. She obtained her Ph.D. in Materials Science and Engineering from Cornell University in 2016, where her graduate research focused on the synthesis and characterization of novel, tunable porous materials prepared using a freeze-casting method.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, Cornell University, 2015

M.S., Materials Science and Engineering, Cornell University, 2014

B.S., Chemistry, College of William and Mary, 2009

National Science Foundation STEM Fellow in K-12 Education GK-12 Fellow

National Science Foundation IGERT FlexEBio Fellow

Bouchet Graduate Honor Society Member

Prior Experience

Manufacturing Manager, Compugraphics Photomasks, 2021-2022

Process Engineer, Compugraphics Photomasks, 2020-2022

Senior Scientist, Sandia National Laboratories, 2018-2019

Senior Process Technology Development Engineer, Intel Corporation, 2015-2018

Chemical Analyst, Community Science Institute, 2010-2011

Advanced Materials and Processing Intern, NASA Langley Research Center, 2008-2009

Undergraduate Researcher, College of William & Mary, 2007-2009

Professional Affiliations

Materials Research Society (MRS)

Society of Plastics Engineers (SPE)

American Chemical Society (ACS)

Society for Photo Optical Instrumentation Engineers (SPIE)

Publications

Pavia Sanders A, Nissen AEH, Lu W-Y, **Longfield TV**, Massey LT, Menon NC, Leong-Hau K, Nelson K, Murtagh D. 2023. Accelerated aging scoping study of additively manufactured coupons. OSTI Technical Report # SAND-2023-08374.

Peters M, Menon NC, Hecht E, **Longfield TV**, Nissen AEH, Campbell J. 2019. Dispenser reliability R&D: materials compatibility. OSTI Technical Report # SAND-2019-3851C.

Inal S, Wan AM, **Williams TV**, Giannelis EP, Fischbach-Teschl C, Gourdon D, Owens RM, Malliaras GG. Conducting polymer scaffolds for electrical control of cellular functions. Proc Vol 9944, Organic Sensors and Bioelectronics IX; 99440Q, 2016.

Wan AMD, Inal S, **Williams TV**, Wang K, Leleux P, Estevez L, Giannelis EP, Fischbach-Teschl C, Malliaras GG, Gourdon D. 3D conducting polymer platforms for electrical control of protein conformation and cellular functions. J. Mater. Chem. B 2015; 3:5040-5048.

Lin Y, **Williams TV**, Xu T, Cao W, Elsayed-Ali HE, Connell JW. Aqueous dispersions of few-layered and monolayered hexagonal boron nitride nanosheets from sonication-assisted hydrolysis: critical role of water. J. Phys. Chem. C 2011; 115(6):2679-2685.

Lin Y, **Williams TV**, Cao W, Elsayed-Ali HE, Connell JW. Defect functionalization of hexagonal boron

nitride nanosheets. J. Phys. Chem. C 2010; 114(41):17434-17439.

Lin Y, **Williams TV**, Connell JW. Soluble, exfoliated hexagonal boron nitride nanosheets. J. Phys. Chem. Lett. 2010; 1(1):277-283.

Lin Y, Watson KA, Ghose S, Smith Jr JG, **Williams TV**, Crooks RE, Cao W, Connell JW. Direct mechanochemical formation of metal nanoparticles on carbon nanotubes. J. Phys. Chem. C 2009; 113(33):14858-14862.

Presentations

Williams TV. Directing structure in porous carbons via freeze-casting. Oral presentation, Edward Bouchet Conference, New Haven, CT, April 2015.

Williams TV. Control of morphology, mechanical properties, and electrical conductivity of hierarchical porous carbons prepared via freeze-casting technique. Oral presentation, 2014 Materials Research Society Fall Meeting, Boston, MA, December 2014.

Williams TV. Tuneable macroporosity of freeze-cast structures – from monoliths to thin films. Oral presentation, 2013 Materials Research Society Fall Meeting, Boston, MA, December 2013.

Williams TV. Freeze-casting for the synthesis of porous polymer films. Poster presentation, KAUST-CU Annual Meeting, Ithaca, NY, May 2013.

Williams TV. Freeze-cast polymer monoliths with tunable mechanical properties and microstructure for cell biology studies. Poster presentation, KAUST-CU Annual Meeting, Ithaca, NY, May 2012.

Williams TV. Exfoliation, dispersion of exfoliated hexagonal boron nitride nanosheets. Poster presentation, NASA Langley Research Center student symposium, Hampton, VA, August 2009.

Williams TV. Boron nitride nanosheets. Oral presentation, NASA Langley Research Center student forum, Hampton, VA, July 2009.

Williams TV. Magnetic susceptibility of Co(SCN)2(i-C3H7OH)2 using FORTRAN. Poster presentation, W&M undergraduate research symposium, Williamsburg, VA, Spring 2009.

Williams TV. Synthesis and characterization of metal-decorated boron nitride. Poster presentation, NASA Langley Research Center student symposium, Hampton, VA, August 2008.

Williams TV. GC-MS determination of methylmercury content in animal tissue. Poster presentation, W&M undergraduate research symposium, Williamsburg, VA, Spring 2008.