Exponent®
Engineering & Scientific Consulting

Brandon DiTullio, Ph.D.

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Professional Profile

Dr. DiTullio is a chemist specializing in polymer science, polymer processing, and electrochemistry. He has a background in the synthesis, characterization, processing, and application of polymeric materials such as organic conjugated polymers that are commonly used in applications such as organic electrodes, thin-film transistors, and bulk-heterojunction solar cells. Dr. DiTullio also has experience with material processing, with several years of experience working with industrial innovation teams to formulate electrically conductive polymeric inks for antistatic coatings and structural electronics applications, which included industrial scale synthesis and extrusion-based additive manufacturing technologies. Additionally, Dr. DiTullio has expertise with device engineering and characterization for bioelectronics applications such as organic electrochemical transistors.

Dr. DiTullio understands how the structure of polymeric materials influences their properties and has experience investigating materials using numerous polymer characterization and electrochemical analytical techniques, including voltammetry, amperometry, electrical conductivity measurements, spectroscopy (e.g., UV-Vis, FT-IR, NMR, Raman, and electrochemical impedance spectroscopy), gel permeation chromatography, and thermal analysis (e.g., TGA and DSC). He also has experience with microscopy and surface characterization techniques, including SEM and confocal microscopy, profilometry, and interferometry that are often used to characterize polymer thin films.

Prior to joining Exponent, Dr. DiTullio was a Department of Defense National Defense Science and Engineering Graduate Research Fellow in the School of Chemistry & Biochemistry at Georgia Institute of Technology, where his work focused on the development of new polymers by tailoring their fundamental organic structures to control optoelectronic and redox properties. His work to innovate new organic polyheterocycles was applied in electrochromism, bioelectronics, and other semiconductor applications. While at Georgia Institute of Technology, Dr. DiTullio also served as the lab safety coordinator where he worked directly with Environmental Health and Safety coordinators to improve the school's lab safety and environmental compliance.

Academic Credentials & Professional Honors

Ph.D., Chemistry, Georgia Institute of Technology, 2022

M.S., Chemistry, Furman University, 2017

B.S., Chemistry, Furman University, 2016

William Emerson Outstanding Mentoring Award, 2021

Department of Defense NDSEG Fellow, 2019

William Emerson Safety Award, 2019

Georgia Tech President's Fellow, 2017

Furman Advantage Research Fellow, 2015

Furman Scholars Award, 2014

Sustainability Science Achievement Award, 2014

Prior Experience

Lab Safety Manager, Georgia Institute of Technology, 2018-2021

Lab Manager, Furman University, 2015-2016

Professional Affiliations

American Chemical Society (ACS)

Publications

DiTullio, B.T., Wright, C. J., Hayes, P., Molino, P. J., Hanks, T. W. Surface modification of polyaniline nanorods with thiol-terminated poly(ethylene oxide). Colloid and Polymer Science, 2018, 296 (4), 637-645.

Jones, A., De Keersmaecker, M., Savagian, L., DiTullio, B.T., Pelse, I., Reynolds, J.R. Branched Oligo(ether) Side Chains: A Path to Enhanced Processability and Elevated Conductivity for Polymeric Semiconductors Advanced Functional Materials, 2021, 2102688.

DiTullio, B.T., Savagian, L.R., Bardagot, O., De Keersmaecker, M., Österholm, A.M., Banerji, N., Reynolds, J.R. Effects of Side-Chain Length and Functionality on Polar Poly(dioxythiophene)s for Saline-Based Organic Electrochemical Transistors. J. Am. Chem. Soc. 2023, 145, 1, 122-134.

DiTullio, B.T., Kuang, X., Osterholm, A., Lang, A., Kinlen, P., Qi, J., Stingelin, N., Reynolds, J.R. Additive Manufacturing of Polyaniline Blends for Lightweight Structures with Tunable Conductivity. J. Mat. Chem. C, 2023, in press.

Presentations

Organic electrochemical transistors for exploratory bioelectronic applications: neuromorphic computing, biosensors, and low-cost, large-area electronics. DCBP (Department of Chemistry, Biochemistry and Pharmaceutical Sciences) Research Seminar, Bern, Switzerland. School of Chemistry, Biochemistry and Pharmaceutical Sciences, room S481. Invited oral presentation, 2022.

Additive manufacturing of semiconducting polymer blends. Chemistry & Biochemistry Graduate Research Symposium, Atlanta, GA. Selected oral presentation, 2021.

Additive manufacturing of semiconducting polymer blends. 2021 Annual SPN Symposium, Atlanta, GA. Selected oral presentation, 2021.

Design, synthesis, and processing of conducting polymers for organic electronic applications. Boeing: Coatings Community of Practice Virtual Symposium, invited oral presentation, 2020.

A conductive, biocompatible hydrogel with tunable electromechanical properties. 15th European Conference on Molecular Electronics (ECME), Linkoping, Sweden. Linkoping Concert & Congress Hall: Konsistoriegatan 7, 2019.

3D printing of conducting polymer composites. Telluride Science Research Center workshop: The Role of Assembly in Dictating the Functionality and Applications of Organic Semiconductors, Telluride, CO. Telluride Intermediate School, invited oral presentation, 2019.

Analysis of the reaction between thiol macromolecules and polyaniline nanofibers. Southeastern Regional Meeting of the American Chemical Society, Columbia, SC. SERMACS 1180: Ballroom C, oral lecture, 2016.

Zeolites: The molecular sieves. Furman University Chemistry Undergraduate Senior Defense Seminar, Greenville, SC. Plyler Science Center, room 249, oral presentation, 2015.

Biofouling and microbial control using polymer nanotechnology. Intelligent Polymer Research Institute, Wollongong, AU. University of Wollongong higher degree research/internship, oral presentation, 2015.

The preparation of biofouling-resistant films of surface-modified polyaniline nanofibers. Joint Southeastern/Southwest Chemistry Regional Meeting, Memphis, TN. SERMACS 1142: Cook Convention Center, Hall 12, Main Auditorium, oral lecture, 2015.

Analysis of the reaction between thiols and polyaniline nanofibers with a quartz crystal microbalance. Joint Southeastern/Southwest Chemistry Regional Meeting, Nashville, TN. SERMACS 1558: Plantation Ballroom, Sheraton Music City Hotel, poster presentation, 2014.