



Exponent[®]
Engineering & Scientific Consulting

Michael Imburgia, Ph.D.

Senior Associate | Polymer Science & Materials Chemistry
1075 Worcester St. | Natick, MA 01760
(508) 652-8508 tel | mimburgia@exponent.com

Professional Profile

Dr. Imburgia provides consulting services in the areas of physical and chemical characterization of polymeric materials specified for use in a variety of industries including building and construction, medical devices and consumer products. Using his broad polymer science and engineering background, he is well versed in the interplay between material formulation, processing and product design. Dr. Imburgia routinely assists clients in testing and evaluating materials and polymeric components for conformance with industry standards published by Underwriters Laboratories (UL), ASTM International, and International Organization for Standardization (ISO). His professional interests include the use of recycled, biodegradable, and compostable polymers in consumer applications, soft and structural adhesives, engineering polymer composites, fiber and fabric technologies, and thin films and packaging.

Prior to joining Exponent, Dr. Imburgia completed his doctorate in Polymer Science and Engineering from the University of Massachusetts Amherst where he studied thin film, elastomer, and fabric mechanics. A large portion of Dr. Imburgia's academic research focused on performing collaborative experiments with biologists, including the study of gecko adhesive systems, which led to the design of new high-strength fabric-elastomer reversible adhesive systems.

Dr. Imburgia has experience with conventional characterization techniques including optical and scanning electron microscopy, mechanical testing (tension, compression, three- and four-point bend, creep, stress-relaxation, dynamic mechanical analysis [DMA]), thermal analysis (differential scanning calorimetry [DSC], thermogravimetric analysis [TGA]), Pressure Sensitive Tape Council and ASTM standard adhesion testing (lap joint, peel, double cantilever beam, probe tack, blister), and surface analysis (ellipsometry, optical profilometry, contact angle, Fourier transform infrared spectroscopy [FTIR]). Dr. Imburgia's past work also includes the design and fabrication of customized mechanical tests and measurements such as micro-scale mechanical and adhesion testing as well as pilot-scale manufacturing setups including roll-to-roll fabrication.

Academic Credentials & Professional Honors

Ph.D., Polymer Science and Engineering, University of Massachusetts, Amherst, 2017

M.S., Polymer Science and Engineering, University of Massachusetts, Amherst, 2012

B.S., Mechanical Engineering, State University of New York, Binghamton, 2011

Peebles Student Award - 39th Annual Adhesion Society Meeting (2016)

Best Poster Award - 38th Annual Adhesion Society Meeting (2015)

Student Poster Travel Award - Pressure Sensitive Tape Council (2013)

Tau Beta Pi, National Engineering Honor Society (2008-Present)

Pi Tau Sigma, National Mechanical Engineering Honor Society (2009-Present)

Prior Experience

Graduate Research Assistant, Polymer Science and Engineering Department, University of Massachusetts, Amherst, 2011-2016

Visiting Researcher, Department of Plant Sciences and Department of Zoology, University of Cambridge, 2016

Undergraduate Research Assistant, Mechanical Engineering Department, State University of New York at Binghamton, 2010-2011

Summer Undergraduate Research Fellow, Building and Fire Research Lab, National Institute of Standards and Technology [NIST], 2010

Professional Affiliations

The Adhesion Society (2013-present)

Society of Plastics Engineers (2017-Present)

Publications

Imburgia, MJ,

Kuo, C-Y, Briggs, DR, Irschick, DJ, Crosby, AJ. Effects of Digit Orientation on Gecko Adhesive Force Capacity: Synthetic and Behavioral Studies. *Integrative and Comparative Biology*, 59.1: 182-192.

Imburgia, MJ.

Deformation and adhesion of soft composite systems for bio-inspired adhesives and wrinkled surface fabrication. Ph.D. Dissertation, UMass-Amherst 2017.

Conith, AJ, **Imburgia, MJ**

, Crosby, AJ, Dumont, ER. The Functional Significance of Complex Dentitions in Early Mammal Evolution. *J. R. Soc. Interface* 2016; 13:20160713.

Imburgia, MJ

, Crosby, AJ. Rolling Wrinkles on Elastic Substrates. *Extreme Mechanics Letters* 2016; 6:23-30.

Tan, KT, White, CC, Hunston, D, Gorham, JM, **Imburgia, MJ**

, Forster, AM, Vogt, BD. Role of Salt on Adhesion of an Epoxy/Aluminum (oxide) Interface in Aqueous Environments. *Polymer Engineering and Science*, 2015; 56.1:18-26.

Gilman, CG, **Imburgia, MJ**

, Bartlett, MD, King, DR, Crosby, AJ, Irschick, DJ. Geckos as Springs: Mechanics Explain Across-Species Scaling of Adhesion. PLoS ONE 2015; 10.6:e0134604.

Presentations

Gupta, C, **Imburgia, MJ**

, Dimitriou, MD, MacLean, SB. Failure-related case studies at Exponent. Poster presentation, 42nd Annual Adhesion Society Meeting, Hilton Head Island, GA, 2019.

Imburgia, MJ

, Crosby, AJ. Impact of loading conditions and geometry on the performance of elastomer-based reversible adhesive systems. Poster presentation, UMass-Amherst CUMIRP Fall Meeting, Amherst, MA, 2016.

Imburgia, MJ

, Crosby, AJ. Tuning reversible adhesion through materials properties and geometry. Poster presentation, NEW.Mech at Harvard University, Boston, MA, 2016.

Imburgia, MJ

, Crosby, AJ. Research in the Crosby Group at UMass Amherst PSE. Invited talk, Department of Plant Sciences, University of Cambridge, Cambridge, UK, 2016.

Imburgia, MJ

, Gilman, CA, Bartlett, MD, King, DR, Irschick, DJ, and Crosby, AJ. Grasping Compliant Interfaces: Mechanical Deformation of Synthetic and Biological Adhesive Systems. Invited talk, 39th Annual Adhesion Society Meeting, San Antonio, TX, 2016.

Imburgia, MJ

, Crosby, AJ. Rolling Wrinkles on Elastic Substrates. Invited talk, UMass-Amherst CUMIRP Fall Meeting, Amherst, MA, 2015.

Imburgia, MJ

, Crosby, AJ. Rolling Wrinkles on Elastic Substrates. Invited talk, American Chemical Society, Fall Meeting, Boston, MA, 2015.

Imburgia, MJ

, Crosby, AJ. Scaling-up Wrinkles: Creating Controlled, Micron-sized Patterns on Meter-sized Surfaces Using a Roll and Plate Geometry. Poster presentation, 38th Annual Adhesion Society Meeting, Savannah, GA, 2015.

Imburgia, MJ

, Crosby, AJ. Rolling Wrinkles on Elastic Substrates. Poster presentation, Pressure Sensitive Tape Council, Tech 36, New Orleans, LA, 2013.