Exponent®
Engineering & Scientific Consulting

Lisa Lallo, Ph.D., P.E., CPP

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Professional Profile

Dr. Lallo's expertise is in understanding the mechanical integrity and evaluating failure modes of complex material systems found in a variety of industries including manufacturing, consumer products, sports and fitness, and medical device and pharmaceuticals. Dr. Lallo's education and professional experience involve the overlap of physics, mechanical engineering, and materials science. As a Certified Packaging Professional, Dr. Lallo places specific emphasis in her career on packaging related professional development and technical committee participation. As a result of being immersed in a number of manufacturing environments, Dr. Lallo has also developed a significant expertise in machinery and industrial equipment operation, safeguarding, and related areas of occupational safety.

Packaging Machinery, Integrity, and Performance

Dr. Lallo is well versed in the packaging space, spanning from the design, installation, and function of packaging machinery to the integrity of packaging systems throughout their total lifecycle. Dr. Lallo has analyzed and assessed packaging machinery performance in food and beverage manufacturing settings and has evaluated packaging systems containing corrugates, cardboard, paper based solutions, cans, bottles, pouches, cartons, and palletized unit loads, among others. She also has expertise in conducting packaging integrity and gap assessments for medical device and pharmaceutical packaging systems, including trays, vials, pouches, cartons, and shippers.

Industrial Equipment and Occupational Safety

Given Dr. Lallo's experience in a number of manufacturing settings, she investigates machine safeguarding and other workplace safety issues, such as lock-out / tag-out and the use of both administrative and engineering controls to reduce residual risk of machine operation. Dr. Lallo is well-versed in numerous machine-related ANSI standards and OSHA regulations. Dr. Lallo has investigated machine guarding and hand tool matters related to cardboard compactors, lathes, wood chippers, snow blowers, food machinery, presses and bending machines, angle grinders, and nail guns.

Dr. Lallo also has broad experience evaluating accidents involving industrial vehicles and equipment. As examples, she has investigated lift trucks, excavators, dump trucks, mining equipment, garage doors, and accidents with automated pickers and gantry systems. As a certified forklift operator and a volunteer with Habitat for Humanity, Dr. Lallo has hands-on construction and jobsite experience.

Friction, Wear, and Mechanical Integrity of Materials

Dr. Lallo investigates the role of tribology (friction, wear, adhesion, and lubrication) on the failure of systems with interacting components or sliding surfaces. Dr. Lallo has investigated the failures of bearings, fasteners, and brake systems. She also investigates the wear of medical devices for product development, including assessments for wear and corrosion of orthopedic implants. Dr. Lallo also has extensive experience evaluating coating systems, including those composed of Diamond Like Carbon, Titanium Nitride, Hydroxyapatite, and Titanium Plasma Sprays.

Mechanical Integrity and Stability of Furniture and Sports and Fitness equipment.

Dr. Lallo has investigated the mechanical integrity of stability of both home and commercial furniture including desks, desk chairs, office chairs, dressers, and stadium chairs. She has also investigated shelving and racking systems in big box and small box stores and warehouses, including specific experience with pallet racks, cantilever racks, end caps, and gondola shelving.

Within the sports and fitness industry, Dr. Lallo has experience with the mechanical performance of team sports equipment, personal exercise equipment, padding, and water sport equipment. Often times, these matters involve assessments of fastener components.

Experimental Mechanical Testing Capabilities

Dr. Lallo has expertise in both custom and standardized testing to evaluate products. Dr. Lallo routinely uses electromechanical, electrodynamic, and servohydraulic load frames to understand material properties, including coefficient of friction, strength, stiffness, and adhesion. She also investigates fracture, wear, and fatigue behavior of polymeric and composite materials. Dr. Lallo uses various characterization techniques to look at surfaces and material microstructure. These techniques include optical microscopy, polarized light microscopy, profilometry, white light interferometry, atomic force microscopy, nanoindentation, CT scanning, and scanning electron microscopy.

Prior to joining Exponent, Dr. Lallo completed her doctoral research at the University of Pennsylvania, where she worked in collaboration with the USDA Forest Products Laboratory to develop, manufacture, and characterize transparent, biodegradable, stiff, and tough sheets of nanocellulose. These materials serve as a potential natural and biodegradable alternative to current plastics in the pulp and paper and packaging industries.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2019

M.S.E., Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2017

B.A., Theology, Saint Joseph's University, 2014

B.S., Physics, Saint Joseph's University, 2014

John A. Goff Doctoral Departmental Award, 2019

NSF Graduate Research Fellowship, 2015-2019

Society of Tribologists and Lubrication Engineers Philadelphia Section Student Scholarship, 2018

John Henry Towne Fellowship (Penn), 2014

Phi Beta Kappa Honors Society, 2013

John P. McNulty Scholar (SJU), 2010-2014

Licenses and Certifications

Professional Engineer, New York, #112328

Professional Engineer, Utah, #12544524-2202

Certified Forklift Operator for Sit-Down Counterbalanced Forklifts

Certified ISO / IEC 17025 Internal Auditor

Certified ISO / IEC 17065 Internal Auditor

Certified Packaging Professional (CPP)

Prior Experience

Nanoindentation Tool Manager, University of Pennsylvania, 2017-2019

Laboratory Safety Coordinator, University of Pennsylvania, 2017-2019

Season Employee, Lowe's, Delran, NJ 2019

Engineering Intern, Parts Life Inc., Cinnaminson, NJ, 2014

Intern, Networks Plus Co., Cinnaminson, NJ 2009-2010

Busser, Chilis, Delran, NJ 2008-2010

Professional Affiliations

American Society of Mechanical Engineers (ASME)

Society of Tribologists and Lubrication Engineers (STLE)

TAPPI (Technical Association of the Pulp & Paper Industry)

ASTM International D10 Committee on Packaging

Insitute of Packaging Professionals

ISO/TC150/WG12 "Implant Coatings"

Publications

(Maiden name: Mariani)

Mariani LM, Johnson WR III, Considine JM, Turner KT. Printing and Mechanical Characterization of Cellulose Nanofibril Materials. Cellulose 2019; 26, 4: 2639-2651.

Bradley LC, Bade, ND, Mariani LM, Turner KT, Lee D, Stebe KJ. Rough Adhesive Hydrogels (Rad gels) for Underwater Adhesion. ACS Applied Materials and Interfaces 2017; 9, 33: 27409-27413.

Mariani LM, Esposito CM, Angiolillo PJ. Observations of Stick-Slip Friction in Velcro. Tribology Letters 2014; 56, 2: 189-196.

Presentations

Invited Seminars:

Mariani LM. Mechanical properties of printed cellulose nanofibril thin films. Summer Student Research Symposium, University of Pennsylvania, Philadelphia, PA, 2019.

Mariani LM. Surface properties and mechanics of additively manufactured cellulose nanofibril films. STLE Philadelphia section, Oreland, PA, 2018.

Selected Conference Presentations and Seminars:

Lallo, LM. Obtaining meaningful experimental data and multi-party inspections. DRI Annual Meeting, Philadelphia, PA, 2022.

Mariani LM, Vankayalapati GS, Considine JM, Turner KT. Characterization of fiber alignment and mechanical properties of printed cellulose nanofibril films. Society for Experimental Mechanics, Reno, NV, 2019.

Vankayalapati GS, Pande SS, Mariani LM, Considine JM, Clemons CM, Turner KT. Preparation and characterization of cellulose nanofibril and polymer composite laminates. Society for Experimental Mechanics, Reno, NV, 2019.

Mariani LM, Turner KT. Mechanical characterization of printed cellulose nanofibril thin films. Mechanical Engineering and Applied Mechanics Departmental Seminar, University of Pennsylvania, Philadelphia, PA, 2018.

Mariani LM, Considine JM, Turner KT. Mechanical characterization of cellulose nanofibril materials made by additive manufacturing. Society for Experimental Mechanics, Greenville, SC, 2018.

Wolf S, Jiang Y, Mariani L, Liu T, Huang G, Ablajan K, Liang XX, Gilmartin P, Toledo T, Li M, Walsh P, Turner K, Fakhraai Z. Measuring hardness of stable glasses using nanoindentation, American Physics Society March Meeting, Los Angeles, CA, 2018.

Mariani LM, Turner KT. Adhesion of cellulose nanofibril thin films. Poster presentation, Gordon Research Seminars Adhesion, Mount Holyoke College, South Hadley, MA, 2015.

Mariani LM, Esposito CM, Angiolillo PJ. Stick-slip friction and ageing in Velcro. American Physics Society March Meeting, Denver, CO, 2014.

Mariani LM, Esposito CM, Angiolillo PJ. Velcro as a model system for stick-slip friction. Northeast Conference of Undergraduate Women in Physics, Cornell University, Ithaca, NY, 2013.

Advisory Appointments

McNulty Advisory Council, Saint Joseph’s University, 2023-present