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Engineering & Scientific Consulting

Raj Bhattacharya, Ph.D.

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Professional Profile

Dr. Bhattacharya is a materials engineer whose background includes broad experience across microelectronics fabrication, materials characterization, battery technology, and electronic device testing. She can assist clients throughout the product development lifecycle through prototype testing, process development, and failure analysis for a wide range of products including consumer electronics, medical devices, and batteries.

Prior to joining Exponent, Dr. Bhattacharya's graduate research at UCLA was focused on the design of radio frequency power limiters for high power satellite applications. As the primary researcher, she collaborated closely with the Basic Research division at Northrop Grumman Corporation. There, Dr. Bhattacharya specialized in materials characterization methods including microscopy (SEM+EDS), crystallography (EBSD, XRD), spectroscopy, and surface techniques (AFM, profilometry). In addition, she acquired extensive experience in electronic device testing, fabrication and development. This included hands-on familiarity with major wafer processing techniques (PVD, ICP etch, spin coating, lithography) and electrical testing in both low and high frequency regimes. She also offers skill in thermal-electrical device CAD modelling through COMSOL, with direct applications for thermal management engineering and failure analysis investigations.

Concurrently to her graduate program, Dr. Bhattacharya also worked as a Fellow in the UCLA Technology Group, where she assisted in the commercial evaluation of UCLA-based early-stage biomedical device start-ups, covering products such as portable electromyography and surgical closures. She provided lifecycle analysis of contemporary competitors and exploration of licensing/patentability potential. Through this program, Dr. Bhattacharya worked with clients to assemble applications for up to $200K in funding and to establish next steps for in-vitro or pre-clinical trials.

Dr. Bhattacharya's undergraduate degree is in chemical engineering from UC Berkeley. During her studies there, she conducted research on battery science and technology, particularly in the transport properties of Li-based polymer electrolytes, as well as on electrode material selection for reserve batteries in ingestible sensor applications.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, University of California, Los Angeles (UCLA), 2023

B.S., Chemical Engineering, University of California, Berkeley, 2018

Prior Experience

Graduate Student Researcher, UCLA, 2018 – 2023

Basic Research Intern, Northrop Grumman Corporation, 2018-2023

Fellow, UCLA Technology Development Group, 2022 - 2023

Patents

US Patent Application 20220364219A1: LaCoO3 THIN FILM DEPOSITION BY DC METAL CO-SPUTTERING, November 2022 (Bhattacharya R, Gambin V)

Publications

Bhattacharya R, Gambin V. Influence of crystallinity and stoichiometry on the high temperature semiconductor-metal transition of thin-film lanthanum cobalt oxide deposited by reactive dc sputtering. Materials Science in Semiconductor Processing 2023; Volume 163, 107595

Bhattacharya R, Khanna A, Bosworth B, Orloff N, Gambin V, Streit D, Fay P, Datta S. Thermally Resilient Microwave Switch and Power Limiter based on Insulator-Metal Transition of Lanthanum Cobalt Oxide. International Electron Devices Meeting 2022; 70-73

Timachova K, Sethi G, Bhattacharya R, Villaluenga I, Balsara N. Ion Diffusion across a Disorder-to-Order Phase Transition in a Poly(Ethylene Oxide)-b-Poly(Silsesquioxane) Block Copolymer Electrolyte. Molecular Systems Design & Engineering 2019; 4 (2), 357–364.

Timachova K, Villaluenga I, Cirrincione L, Gobet M, Bhattacharya R, Jiang X, Newman J, Madsen L, Greenbaum S, Balsara N. Anisotropic Ion Diffusion and Electrochemically Driven Transport in Nanostructured Block Copolymer Electrolytes. The Journal of Physical Chemistry B 2018; 122 (4), 1537–1544.

Pesko D, Timachova K, Bhattacharya R, Smith M, Villaluenga I, Newman J, Balsara, N. Negative transference numbers in poly (ethylene oxide)-based electrolytes. Journal of Electrochemical Society 2017; 164 E3569

Presentations

Bhattacharya R, Gambin V. “Materials Characterization of LaCoO3 Grown by Optimized Reactive DC Magnetron Sputtering” 64th Electronic Materials Conference 2022

Bhattacharya R. “New Materials for Fuses that Work in Space” UCLA GradSlam 2022

Bhattacharya R, Gambin V. “Material characterization and contact resistivity of LaCoO3 grown by optimized DC magnetron sputtering” ACerS Electronics Materials and Applications Conference 2022

Bhattacharya R, Gambin V. “LaCoO3 as an insulator-metal transition material for RF Power Limiters” Northrop Grumman Basic Research Seminar 2021

Bhattacharya R, Kuciej M, Wolan B. “Basic Research Initiatives” Northrop Grumman Explore Aerospace 2021 (Poster Presentation)