

Exponent®
Engineering & Scientific Consulting

Husna Anwar, Ph.D.

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Professional Profile

Dr. Anwar has extensive experience in interdisciplinary engineering and materials science, specializing in the areas of photovoltaics (PV) and distributed energy systems. She has over a decade of expertise in project management, energy infrastructure and next-generation optoelectronic device development. At Exponent, Dr. Anwar leverages her in-field construction experience and tenure performing in-laboratory research to provide clients with a unique holistic perspective that spans scientific theory to practical application. Dr. Anwar's services include technical evaluation and failure analysis of solar and energy storage systems, product development for emerging PV technologies and materials, lifecycle performance assessments of energy assets, and technical advisement on decarbonization through sustainable electrification.

Prior to joining Exponent, Dr. Anwar designed and managed solar installations in NYC and NJ. During this time, she trained as a NABCEP PV installation professional, gained expertise in solar attachment and racking systems, tax and incentive structures, roofing systems, construction permitting, vendor coordination, procurement, and utility interconnection. She has managed construction workflows from conception and design through operations and maintenance. Dr. Anwar has also sized and designed microgrids combining rooftop solar with battery storage and cogeneration systems for resiliency and peak shaving. She is adept with tools such as Helioscope, AutoCAD, SketchUp and Procore.

Dr. Anwar's has deep experience in project management, coordinating multidisciplinary teams and delivering technical reports to stakeholders ranging from property developers to investors. She is well versed in fire and building codes in the tristate area and NFPA NEC codes and standards as they pertain to PV systems and has navigated complex regulatory environments. For instance, Dr. Anwar has routinely engaged with utilities and authorities having jurisdiction such as Con Edison, NYSERDA, PSEG-NJ, National Grid, FDNY, and OTCR. Having worked extensively on affordable housing projects in NYC, she has also coordinated with NYC Department of Buildings, Landmarks and Preservation, Housing Preservation and Development and other city agencies.

Dr. Anwar received her Ph.D. in Electrical and Computer Engineering from the University of Toronto. As a doctoral student, she built on her undergraduate research exploring planar device architectures for organic and quantum dot PV. Dr Anwar led the optoelectronics thrust within the Alliance for AI-Assisted Accelerated Materials Discovery consortium working with industry clients. Dr. Anwar collaborated and advised on material solutions ranging from metal-halide perovskites, colloidal quantum dots, organic polymers, inorganic metal oxides and small molecules. She utilized these materials to fabricate, characterize and optimize thin-film PV, LEDs, piezoelectrics for energy harvesting, and electro-optical modulators. For her final doctoral project, she supplemented her benchtop experimentation by designing robotic workflows and integrating machine learning methods into her data analysis. She designed an automated photoluminescence setup to complete single crystal synthesis and characterization in high throughput. This method accelerated the material discovery process by over 120x and led to her publishing the discovery of a novel emissive perovskite material. Dr. Anwar has utilized a variety of

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fabrication and characterization techniques including solution processing (spin, spray, drop, blade and slot-die casting), vacuum deposition (RF sputtering, thermal and electron beam evaporation, ALD), single crystal growth (anti-solvent and acid-assisted crystallization), characterization methods (UV-vis, PLQY, EQE, XRD, AFM), advanced x-ray scattering and synchrotron beamline measurements (GIWAXS, GISAXS), and modelling and data analysis (python, R, Unix).

Academic Credentials & Professional Honors

Ph.D., Electrical and Computer Engineering, University of Toronto, Canada, 2024

B.A., Physics, Mount Holyoke College, 2015

Queen Elizabeth II Graduate Scholarship in Science & Technology

Ontario Graduate Scholarship

Sigma Pi Sigma

magna cum laude

DAAD Rise Scholarship

Prior Experience

Project Manager/Engineer, **Bright Power Inc.**, 2016-2019

Physics Teaching Assistant, Peer Mentor, **Mount Holyoke College**, 2013-2015

Research Intern, **Max Planck Institute for Polymer**, Research 2014

City News Sub-editor, **The Express Tribune**, 2010-2011

Languages

Urdu

Publications

Anwar H, Johnston A, Mahesh S, Singh K, Wang Z, Kuntz D, Tamblyn I, Voznyy O, Prive G, Sargent E. High-throughput evaluation of emission and structure in reduced-dimensional perovskites. ACS Cent. Sci. 2022; 8(5):571-580.

Lee S, Park S M, Jung ED, Zhu T, Pina JM, Anwar H, Sargent E, et al. Dipole engineering through the orientation of interface molecules for efficient InP quantum dot light-emitting diodes. J. Am. Chem. Soc. 2022; 144(45):20923-20930.

Xia P, Sun B, Biondi M, Xu J, Atan O, Imran M, Hassan Y, Liu Y, Pina J, Morteza Najarian A, Grater L, Bertens K, Sagar L, Anwar H, Choi M-J, Zhang Y, Hasham M, García de Arquer FP, Hoogland S, Sargent E. Sequential co-passivation in InAs colloidal quantum dot solids enables efficient near-infrared photodetectors. Advanced Materials 2023; 35.

Ochsmann JR, Chandran D, Gehrig DW, Anwar H, Madathil PK, Lee K-S, Laquai FM. Triplet state formation in photovoltaic blends of DPP-type copolymers and PC71BM. Rapid Commun. 2015; 36(11):1122-1128.

Presentations

Anwar H, Choubisa H, Bertens K, Sargent E. Machine-learning assisted discovery of high-mobility materials. Oral Presentation, Materials Research Society Fall Meeting, Boston, MA, 2022.

Peer Reviews

American Chemical Society Publications