



**Exponent**<sup>®</sup>  
Engineering & Scientific Consulting

## Anna Overholts, Ph.D.

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### Professional Profile

Dr. Overholts is trained as a polymer chemist, with extensive work in the field of polymer mechanochemistry. Her broad range of experience includes polymer catalysis, reaction kinetics, and development and characterization of stimuli-responsive materials.

As a chemist from an interdisciplinary field, Dr. Overholts is skilled in both small molecule and macromolecular synthesis, including a variety of controlled polymerization methods. She has experience in the characterization of polymeric materials, with expertise in techniques such as NMR, LCMS, gel permeation chromatography (GPC), fluorescence spectroscopy, UV-vis spectroscopy, and differential scanning calorimetry (DSC).

Prior to joining Exponent, Dr. Overholts earned her Ph.D. from Caltech with a research focus on developing new force-responsive small molecules for stress sensing and mechanochemical lithography in polymeric materials. She additionally studied the kinetics of these force-induced reactions. From this work she has practical knowledge of the impact of mechanical force in polymeric materials on the scale of atomic bonds.

### Academic Credentials & Professional Honors

Ph.D., Chemistry, California Institute of Technology (Caltech), 2023

A.B., Chemistry, Cornell University, 2018

Barbara J. Burger Graduate Fellowship, 2022

American Chemical Society Undergraduate Award in Organic Chemistry, 2018

### Prior Experience

NSF Graduate Research Fellow, Division of Chemistry and Chemical Engineering, Caltech, Oct. 2018 – May 2023

### Patents

Robb, M. J.; Overholts, A. C. "Method for multicolor lithography using mechanical force." U.S. Provisional Patent Application No. 63/325,282. March 30, 2022.

## Publications

McFadden, M. E.; Barber, R. W.; Overholts, A. C.; Robb, M. J. "Naphthopyran molecular switches and their emergent mechanochemical reactivity." *Chem. Sci.* 2023. In Press.

McFadden, M. E.; Overholts, A. C.; Osler, S. K.; Robb, M. J. "Validation of an accurate and expedient initial rates method for characterizing mechanophore reactivity." *ACS Macro Lett.* 2023, 12, 440-445.

Overholts, A. C.; Granados Razo, W.; Robb, M. J. "Mechanically gated formation of donor–acceptor Stenhouse adducts enabling mechanochemical multicolor soft lithography." *Nat. Chem.* 2023, 15, 332-338.

Luo, S. M.; Barber, R. W.; Overholts, A. C.; Robb, M. J. "Competitive activation experiments reveal significantly different mechanochemical reactivity of furan–maleimide and anthracene–maleimide mechanophores." *ACS Polym. Au.* 2023, 3, 202-208.

Overholts, A. C.; Robb, M. J. "Examining the impact of relative mechanophore activity on the selectivity of ultrasound-induced mechanochemical chain scission." *ACS Macro Lett.* 2022, 11, 733-738.

Overholts, A. C.; McFadden, M. E.; Robb, M. J. "Quantifying activation rates of scissile mechanophores and the influence of dispersity." *Macromolecules* 2022, 55, 276-283.

Smith, B. J.; Parent, L. R.; Overholts, A. C.; Beaucage, P. A.; Bisbey, R. P.; Chavez, A. D.; Hwang, G.; Park, C.; Evans, A. M.; Gianneschi, N. C.; Dichtel, W. R. "Colloidal covalent organic frameworks." *ACS Cent. Sci.* 2017, 3, 58-65.

Smith, B. J.; Overholts, A. C.; Hwang, G.; Dichtel, W. R. "Insight into the crystallization of amorphous imine-linked polymer networks to 2D covalent organic frameworks." *Chem. Commun.* 2016, 52, 3690-3693.

## Presentations

"Multicolor Mechanochemical Lithography in Polymeric Materials." ACS National Meeting, San Diego, CA, Mar. 20, 2022.