



**Symone Alexander, Ph.D.**

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**Valorization and Regeneration of Cellulose Sourced from  
Restaurant Food Waste**

**Abstract**

The Alexander Research Team uses nature as inspiration for everything we do – from reverse engineering biological systems for engineering design to using self-assembly and structural hierarchy to access new material properties. Biopolymers like cellulose are found naturally and abundantly in plants. However, the shift to utilize biopolymers to reduce the environmental impact of materials has revealed significant challenges in valorization, characterization, and processing due to their structural complexity. The goal of this work is to design sustainable, environmentally friendly platforms to extract biopolymers from real-world, mixed food and agricultural waste and introduce new techniques for regeneration of porous cellulose materials. We show that mixed, uncontrolled food waste from a restaurant can be reproducibly converted into cellulose using a process that results in waste streams that can be poured down the drain. From the materials design perspective, we show that the 3-D regeneration of cellulose can be easily controlled by tuning cellulose solution behavior. This drastically reduces the variability in mechanical properties and small molecule transport of porous cellulose materials and enables their translation into to new technology.

**Biography**

Dr. Symone Alexander is an Assistant Professor in the Department of Chemical Engineering at Auburn University. Her research group applies fundamental engineering principles to biological protein and polysaccharide assemblies, with the goal of improving valorization processes and design of new biopolymer-based materials. Prior to her role at Auburn University, she was an Eckert Postdoctoral Research Fellow at Georgia Institute of Technology in the Department of Chemical and Biomolecular Engineering, where she led investigations on extreme organismic biophysics with a focus on ultra-fast motion in nature in Prof. Saad Bhamla's research group. She earned her Ph.D. in Macromolecular Science and Engineering as an NSF Graduate Research Fellow at Case Western Reserve University, advised by Prof. LaShanda Korley. During her graduate career, she led research on the influence of high molecular weight polymers on self-assembling small molecules and how those networks can be utilized to generate bioinspired, responsive polymer composites. She obtained a B.S. in Chemical Engineering from Howard University in 2013, where she investigated DNA-polymer assemblies utilizing Atomic Force Microscopy under the advisement of Dr. Preethi Chandran and Dr. Joseph Cannon. Dr. Alexander is a recipient of numerous awards and honors, including a 2024 Graduate Mentor Award from the Auburn University Graduate School, 2023 AFOSR Summer Faculty Fellowship, grad and postdoc fellowships, selection as a 2020 Emerging Leader by Georgia Tech Dept. of Mechanical Engineering, selection as a 2019 American Chemical Society Future Faculty Scholar (ACS PMSE), and being selected as a 2018 Rising Star in Chemical Engineering by the Massachusetts Institute of Technology (MIT).

**NOBCChE Coffee Hour and Round Table**

Join us for a round table discussion and coffee hour with our speaker and members of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) about navigating careers in academia. This is an opportunity to share perspectives, ask questions, and explore the unique challenges and opportunities within academic career paths.

Please register your interest using the QR code on the bottom left of this flyer. The round table and coffee hour will take place at 11am in CLB 366 after the seminar.

 **February 28**

 **10:00 AM**

 **CLB 366**



**Register to  
watch live on  
Zoom**



**Register to join  
the Round Table**