



CHE-PETE SEMINAR SERIES

Advanced Separations and Conversions for Integration in Biorefining Processes

SANKAR NAIR

This seminar will discuss our progress in developing materials-based biomass separation and conversion processes. The discussion is placed in the context of three interconnected issues. First, we will illustrate the importance of imagining biorefineries as an interconnected network of conversion and separation processes, and the possibility for materials-based separations to enable new ways of fractionating complex feedstocks as well as purifying/valorizing stream components such as lignin and molecular constituents such as carboxylic acids, diols, and lignin-derived monomers. Second, we will illustrate the differing separation challenges encountered in stream fractionation versus product purification, and the appropriate integration of separation processes to create economic viability. Third, we will explore our discovery and development of versatile and inexpensive separation and conversion materials that can handle complex multicomponent streams in harsh conditions of temperature, pH, and high dissolved solids content. The discussion will highlight our new models of both forest-based (kraft process) and agro-based (residues-to-biofuels/chemicals process) integrated biorefineries.

ENGINEERING NORTH 450

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Sankar Nair is a Professor, Simmons Fellow, and Bulluck Fellow, in the School of Chemical & Biomolecular Engineering at Georgia Tech. He also served as Associate Chair for Industry Relations from 2015-2025. His research interests are in the science and engineering of nanoporous materials for the development of new and more sustainable chemical processes. His work focuses on nanoporous membrane and adsorbent-based separation systems and intensified processes that can enable new technological paths in biorefining, plastics upcycling, industrial water management, and utilization of unconventional feedstocks (e.g., CO₂, shale gas). Prof. Nair has authored/co-authored more than 200 publications and holds 25 granted US/PCT patents. His research group has graduated more than 50 PhD, postdoctoral, and MS researchers. He is an Executive Editor of *Chemical Engineering Science* and an editorial advisory board member of *ACS Sustainable Chemistry & Engineering*.

